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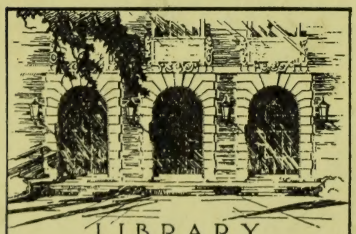

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CONTENTS.

Descriptions of Micro-Lepidoptera from Queensland.

By A. Jefferis Turner, M.D.

[Read March 3rd, 1896.]

A somewhat hasty and unexpected visit to Europe during the printing of my former paper in the Transactions of the Royal Society of South Australia, 1894, p. 120, prevented my reading the proofs, and I must request those who refer to it to correct the following printer's errors which have crept in :—

For *Grac. eumetella*, Meyr., read *Grac. eumetalla*, Meyr.

For using the leaves, read mining the leaves.

For *Grac. albospersa*, n. sp., read *Grac. albispersa*, n. sp.

For *Grac. albomaculella*, n. sp., read *Grac. albimaculella*, n. sp.

For *Grac. enchlamyda*, n. sp., read *Grac. euchlamyda*, n. sp.

For *Lepidotarsa chryscrythra*, n. sp., read *Lepidotarsa chryserythra*, n. sp.

My recent journey has enabled me to compare my types with those of Mr. Meyrick, who, with his usual generosity, has given me invaluable help in their identification and classification. He has placed me in a position to rectify several errors in my former paper, and has saved me from many into which I should have otherwise fallen in the present instalment. At the same time it must be understood that for any errors which may exist in the present paper, I take the whole responsibility.

I have endeavored to give a complete list of all the species known to occur in the district of Moreton Bay.

GRACILARIIDÆ.

Gracilaria, *Z.*

The Brisbane list must be enlarged by the addition of the following species, all of which are common here, but were previously overlooked :—

G. nereïs, Meyr. (*G. fluorescens*, mihi, is a synonym) ; *G. eupetala*, Meyr. ; *G. alysidota*, Meyr. ; *G. tricuneatella*, Meyr.

G. pyrigenes, *n. sp.*

I substitute this for *G. nitidula* of my former paper, the latter name having been preoccupied by Stainton for an Indian species (British Museum Catalogue XXX., 30).

G. OPHIODES, *n. sp.*

8 mm. Head and face white. Maxillary palpi minute, white. Labial palpi white; second joint with an apical, terminal joint with a median fuscous ring. Antennæ longer than forewings, whitish at base, gradually becoming dark fuscous. Thorax white; shoulders pale ochreous-fuscous. Abdomen dark fuscous. Legs fuscous; posterior tibiæ and bases of all tarsal joints white; middle tibiæ not thickened. Forewings pale ochreous-fuscous; a broad white line, black-margined in disc, along inner margin from base to middle, whence it proceeds obliquely outwards to middle of costa; an elongated white blotch on inner margin, ending abruptly at anal angle where it is thickened to reach more than half across disc, partially black-margined; a black line along posterior half of costa; a white spot on hindmargin above anal angle; costal cilia ochreous-fuscous, at apex white, with a transverse black bar and black apices, thence whitish. Hindwings and cilia dark grey.

Very distinct by the basal white line. Brisbane; one specimen on a fence in September.

ORNIX, *Z.*

I am indebted to Mr. Meyrick for the identification of this genus, which is new to Australia. It may be distinguished from *Gracilaria*, which the species described closely resembles, by the long forwardly directed tuft of scales on the head.

ORNIX AUSTRALIS, *n. sp.*

9-10 mm. Head with long tufted scales white above, fuscous on inferior aspect. Face, labial, and maxillary palpi white. Antennæ longer than forewings, dark fuscous. Thorax white, shoulders fuscous-grey. Abdomen dark fuscous. Legs whitish; anterior and middle femora and tibiæ, and posterior femora with longitudinal fuscous stripes; posterior tibiæ whitish; tarsi whitish on inferior surface, on superior surface fuscous, except apices of each joint which are pure white. Forewings fuscous-grey; a narrow white streak along costa from base to four-fifths; a broad white line along inner and hindmargin. At anal angle this broadens to one-half breadth of wing, and contains a narrow fuscous-grey streak, internal to which are a few scattered fuscous-grey scales Sometimes this streak is continuous with ground color posteriorly. An outwardly oblique, narrow, black-margined, white streak, from costa at four-fifths, not quite reaching hindmarginal line; a second white streak, anteriorly black-margined, just before apex, parallel to first; cilia on costa fuscous, at apex pure white, with a transverse black line, then a black subapical hook, beneath this again pure white, then fuscous to anal angle. Hindwings and cilia dark-grey.

Very similar in appearance to some species of *Gracilaria*. It has the same rest-attitude. Brisbane ; taken commonly on a fence from September to November ; probably from an adjacent thicket of *Acacia Cunninghami*.

ŒCOPHORIDÆ.

Palparia, *Wing*.

Palparia euryptera, *n. sp.*

Female, 35 mm. Head and face pale ochreous. Palpi with tuft of second joint dense, porrected, as long as terminal joint ; pale ochreous, tuft pinkish, at extremity fuscous ; terminal joint pink. Antennæ pinkish. Thorax pink. Abdomen whitish ochreous, beneath pale yellow. Legs dusky pink ; posterior tibiæ, except spurs, pale yellowish. Forewings broad, costa strongly arched, especially in outer half, apex acute, hindmargin oblique, sinuate ; pink, densely irrorated with pale ochreous, especially towards hindmargin ; costal edge narrowly ochreous from one-fourth to apex ; cilia pale ochreous, apical third pinkish except on costa and anal angle, towards apex fuscous. Hindwings ovate, hindmargin rounded ; whitish-ochreous ; posteriorly pinkish tinged ; cilia whitish-yellow, with a pinkish line at apex.

Intermediate between *P. lambertella*, Wing, and the more usual forms of the genus. Brisbane ; one specimen taken by Mr. Illidge in October.

Eomystis, *Meyr.*

The species referred here has no specific affinity to the type, and Mr. Meyrick considers that it should be referred to *Heliocausta*, although it answers to the generic characters of *Eomystis*, which, indeed, are scarcely distinguishable from those of the former.

Eurypelta, *Turner.*

This genus was founded in error on a female specimen, and must be withdrawn.

The species must be referred provisionally to *Heliocausta*, pending the discovery of the male.

Hemibela, *Turner.*

The species on which this genus was founded is closely allied to *Ocystola tyranna*, Meyr., with which it agrees in the extremely short terminal joint of the palpi. It must therefore be provisionally referred to that genus. Perhaps eventually it may be found necessary to divide the genus *Ocystola*, in which case the above genus may be retained.

Euphiltra, *Meyr.*

E. thermozona, Turner, is a synonym for *E. eroticella*, Meyr.

Heliocausta, *Meyr.*

The following have been taken in the neighborhood of Brisbane:—*H. inceptella*, Walk.; *H. pelosticta*, Meyr.; *H. triphænatella*, Walk.; *H. protoxantha*, Meyr.; *H. rhodoxantha*, Meyr.; *H. mimica*, Meyr.; *H. phylacopis*, Meyr.; *H. acmæa*, Meyr.; *H. acribes*, Turner; *H. epiprepes*, Turner.

Heliocausta acosmeta, *n. sp.*

Female, 23 mm. Head, palpi, antennæ, and thorax pinkish-ochreous. Abdomen whitish. Legs ochreous-whitish. Forewings moderate, oblong, costa moderately arched toward base posteriorly straight, apex retangular, hindmargin straight; ochreous, inclining to pinkish; costal edge uniformly colored with disc; markings very obscure in pale fuscous; a fine dentate line curving outwards from costa beyond middle, and becoming parallel to hindmargin at six-fifths; traces of a median and inner line; a series of faint dots on hindmargin; cilia unicolorous with disc, paler at apices. Hindwings whitish; hindmargin and apex ochreous tinged; cilia ochreous-whitish, with a median fuscous line at apex.

The natural position of this insect is between *H. inceptella*, Walk., and *H. severa*, Meyr. Brisbane; one specimen.

Heliocausta achroa, *n. sp.*

Male, 20 mm. Head, palpi, antennæ, and thorax whitish-grey; terminal joint of palpi darker anteriorly. Abdomen whitish-grey. Anterior legs fuscous; middle and posterior whitish, tarsi fuscous. Forewings moderate; costa moderately arched toward base, posteriorly straight; apex obtusely rounded; hindmargin scarcely oblique; whitish-grey, markings fuscous; a row of minute dots from costa about middle towards hindmargin, sharply bent in disc at five-sixths, and continued parallel to hindmargin to inner-margin; a few scattered fuscous scales in disc; a row of dots along costa from four-fifths to apex, and along hindmargin to anal angle; cilia whitish-grey. Hindwings and cilia grey.

Brisbane; three specimens in October.

Heliocausta complanula, *n. sp.*

Male, 18-20 mm. Head and thorax whitish-ochreous, slightly brownish tinged; face whitish. Antennæ whitish. Palpi rosy-whitish, terminal joint ochreous-fuscous. Abdomen ochreous-fuscous; tuft ochreous. Legs ochreous-whitish; anterior pair suffused with pink. Forewings moderately elongate, costa slightly

arched, apex rectangular, hindmargin scarcely oblique ; whitish-ochreous, faintly brownish-tinged ; costal edge pale rosy ; a fuscous dot in disc before middle, sometimes obsolete ; a second in disc beyond middle, and a third in fold obliquely beyond first ; a few faint fuscous dots in disc at four-fifths, parallel to hindmargin ; a row of fuscous dots on hindmargin ; cilia pale rosy, apices whitish. Hindwings pale fuscous, darker at apex ; cilia pale fuscous, with a darker line near bases.

Closely allied to *H. acmœa*, Meyr., and *H. protoxantha*, Meyr., but may be distinguished from both. Brisbane ; two specimens.

Heliocausta simplex, *n. sp.*

Female, 17-20 mm. Head and thorax ochreous-brownish. Antennæ fuscous. Palpi anteriorly fuscous ; posteriorly whitish. Abdomen ochreous. Legs whitish ; anterior tibiæ and tarsi fuscous or pinkish-fuscous ; posterior tibiæ and tarsi ochreous-whitish. Forewings rather elongate, costa moderately arched, apex rounded, hindmargin oblique ; brownish-ochreous, thickly irrorated with whitish scales, without markings ; costal edge sometimes rosy ; cilia grey. Hindwings pale yellowish ; cilia pale yellowish, apices whitish.

Brisbane ; two specimens.

Heliocausta phanozona, *n. sp.*

Female, 18 mm. Head white, face fuscous. Antennæ white, with black annulations, basal joint white. Palpi, second joint fuscous, at base and apex whitish ; terminal joint whitish. Thorax white, posterior apex fuscous. Abdomen ochreous fuscous. Legs ochreous-whitish, anterior tibiæ and tarsi pale fuscous. Forewings rather elongate, costa moderately and evenly arched, apex rounded, hindmargin oblique ; white, with four transverse fasciæ ; first fascia at base, slightly outwardly oblique, tawny-fuscous ; second from costa at one-third to middle of hindmargin, reddish-brown, anterior margin deeply concave, connected with basal fascia by a narrow tawny-fuscous line along costal edge, posterior margin irregular and suffused, partly suffusedly confluent with third fascia in costal portion of disc ; third from beyond middle of costa to inner margin before anal angle, tawny-fuscous on costa, then reddish-brown for one-third breadth of disc, remainder tawny-fuscous, narrower than second, both margins irregular ; fourth along hindmargin, broad at costa, gradually narrowing to a point just above anal angle, anterior portion tawny-fuscous, posterior paler fuscous, anterior edge somewhat sinuate ; cilia ochreous-whitish, bases fuscous, at anal angle uniformly pale-reddish-fuscous. Hindwings and cilia uniform pale reddish-ochreous-fuscous.

This species is not near any known species of *Heliocausta*: nevertheless, as far as can be determined from the female, it appears to possess all the characters of the genus. Brisbane; one specimen.

EUCHÆTIS, *Meyr.*

EUCHÆTIS RHIZOBOLA, *Meyr.*

Brisbane.

EURYPLACA, *Meyr.*

EURYPLACA OCELLIFERA, *Meyr.*

Brisbane.

EUPRIONOCERA, *n. g.*

Head with appressed scales, sidetufts moderate, loosely appressed. Antennæ moderate, in male coarsely serrated (one), and with fine, very short ciliations (one-fourth). Pecten absent. Palpi moderate, second joint reaching base of antennæ, with appressed scales, terminal joint shorter than second, moderate, recurved. Thorax smooth. Forewings moderately elongate, hindmargin almost straight. Hindwings broader than forewings, cilia one-fifth. Abdomen rather stout. Forewings with vein seven to hindmargin, two from before angle of cell. Hindwings normal.

Distinguished by the well-marked serrated antennæ of the male and the broad hindwings. In other respects it appears allied to *Heliocausta*.

EUPRIONOCERA GEMINIPUNCTA, *n. sp.*

Male and female, 24-30 mm. Head, thorax, and palpi pinkish-ochreous; face paler. Antennæ fuscous. Abdomen ochreous, beneath pinkish-ochreous. Legs pinkish-ochreous. Forewings moderately elongate, costa gently arched, more strongly at base, apex obtusely rectangular, hindmargin almost straight; uniform dull pinkish-ochreous; a conspicuous dark-fuscous dot in disc at two-thirds; a variable number of single dark-fuscous scales along veins; cilia dull pinkish-ochreous. Hindwings ochreous-whitish, apical portion dull pinkish-ochreous; cilia dull pinkish-ochreous, towards anal angle whitish.

Brisbane; two specimens.

HOPLITICA, *Meyrick.*

The following have been taken about Brisbane:—*H. sobriella*, Walk.; *H. sericata*, Meyr.; *H. carnea*, Z.; *H. repandula*, Z.; *H. pudica*, Z.; *H. leucerythra*, Meyr.; *H. costimacula*, Meyr.; *H. rufa*, Meyr.; *H. colonias*, Meyr.; *H. absumptella*, Walk.; *H. jucundella*, Walk.

Hoplitica rufimaculella, *n. sp.*

Male, 19 mm. Head and thorax pinkish-ochreous, face whitish. Palpi, second joint whitish towards base, towards apex rosy; terminal joint rosy-fuscous. Antennæ grey, basal joint pinkish-ochreous. Abdomen whitish-grey. Legs whitish-grey, anterior tibiæ and tarsi carmine. Forewings moderate, costa moderately arched, apex rounded, hindmargin oblique; pinkish-ochreous, with scattered scales of a deeper pink forming indistinct markings; a dot in disc before middle, a second beyond middle; a faintly indicated line from middle of costa obliquely outwards, sharply bent in disc at five-sixths, and continued parallel to hindmargin to inner-margin before anal angle; many faint pink dots along hindmargin, and in disc showing a tendency to form anterior and median lines; cilia pinkish-ochreous, tips whitish. Hindwings whitish, tinged with grey towards hindmargin; cilia grey, with a paler basal line.

Brisbane; one specimen. I could have taken more, but mistook it at the time for *H. leucerythra*, Meyr., which it closely resembles. It may be distinguished by the dots on the forewing being pink, instead of dark-fuscous. The smaller size and pink thorax distinguish it from *H. liosarca*, Meyr.

Hoplitica eoxantha, *n. sp.*

Male and female, 19-23 mm. Head and thorax ochreous-brownish; face ochreous. Palpi second joint whitish, suffused with pale reddish except at base; terminal joint anteriorly fuscous, posteriorly reddish. Antennæ pinkish-ochreous, sharply annulated with black; basal joint ochreous beneath, reddish above. Abdomen ochreous-yellow. Legs whitish-ochreous; anterior tibiæ and tarsi reddish, the latter annulated with purplish-fuscous. Forewings moderate, costa strongly arched at base, thence almost straight, apex obtuse, hindmargin oblique; whitish, thickly irrorated with red scales; costal edge red, extreme edge whitish; markings purplish-fuscous, indistinct; a discal dot at two-fifths, and a second at four-fifths; three indistinctly suffused transverse lines, all partially obsolete, first at one-fifth, second just posterior to first, third through second dot, distinct on costa; a fourth line parallel to hindmargin, indistinct towards costa; a row of suffused dots along hindmargin; cilia pale pinkish, sparsely irrorated with red scales. Hindwings and cilia yellow.

Brisbane; four specimens in October.

Hoplitica atripunctatella, *n. sp.*

19-22 mm. Head and thorax pale-pinkish-grey; face whitish. Palpi whitish, terminal joint tinged with pink anteriorly. Antennæ pale-pinkish-grey, terminal half or two-thirds fuscous.

Abdomen whitish-ochreous. Legs whitish-ochreous; anterior tibiæ and tarsi reddish. Forewings moderate, costa moderately arched, apex obtuse, hindmargin oblique; pale pinkish-grey; markings jet-black; a discal dot before middle, a second beyond middle, a third on fold obliquely beyond first; a row of dots from costa before middle obliquely outwards, sharply bent in disc at five-sixths, and continued to hindmargin before anal angle; a very variable number of dots or scattered black scales in disc; a row of black dots along apical third of costa and hindmargin to anal angle; cilia pale-pinkish-grey. Hindwings whitish, apex and hindmargin sometimes pale-fuscous; cilia whitish, at apex pale-fuscous.

Brisbane; five specimens.

Hoplitica porphyraspis, *n. sp.*

Male and female, 19-25 mm. Head, face, thorax, palpi, and antennæ whitish-grey. Abdomen ochreous-fuscous, beneath whitish-ochreous. Legs whitish-ochreous; anterior tarsi barred with fuscous. Forewings moderate, not dilated; costa gently arched, apex obtusely rounded, hindmargin oblique; whitish-grey, irregularly suffused with dark-fuscous scales; basal one-third of costa, apex, and upper half of hindmargin dark-fuscous; a very large semicircular purplish-fuscous blotch extending on inner-margin from one-fifth nearly to anal angle reaching two-thirds across disc, its anterior margin rounded, its posterior margin straighter, more oblique, and acutely angled just above anal angle; two small purplish-fuscous dots in disc posterior to summit of dorsal blotch; posterior portion of disc more or less suffused with fuscous, with a paler line first oblique, then parallel to hindmargin, faintly indicated; cilia fuscous with a paler basal line, paler at anal angle. Hindwings pale-ochreous, apex suffused with fuscous; cilia pale-ochreous, at apex fuscous.

The large dorsal blotch recalls *H. colonias*, Meyr. Brisbane; five specimens.

Hoplitica pyrrhella, *n. sp.*

Male and female, 13-19 mm. Head and face yellowish, with a red dot beneath base of each antenna. Palpi yellowish, second joint with a subapical fuscous ring, a broad median band of terminal joint fuscous. Antennæ yellowish, annulated with dark-fuscous. Thorax, anterior half crimson-red, edged with fuscous anteriorly; posterior half clear yellow, shoulders clear yellow, edged with red externally. Abdomen dark-fuscous, tuft ochreous; inferiorly ochreous-fuscous. Legs ochreous; tibiæ and first tarsal joints of anterior and middle pair with subapical fuscous annulations. Forewings elongate, costa moderately arched, apex round pointed, hindmargin very obliquely rounded; crimson-red

markings clear yellow, margined with dark-fuscous ; four incomplete or interrupted fasciæ, and a discal spot ; extreme basal portion of inner margin yellow; first fascia from base of costa to inner-margin at one-fourth, interrupted at fold, and thence dilated to inner-margin, where it contracts abruptly ; second from costa at one-fourth obliquely outwards, angled inwards in disc, and abruptly interrupted at fold, where it sometimes anastomoses with first, thence it is continued by a yellow spot on fold, and a second spot obliquely beyond this on inner-margin beyond middle ; third from middle of costa to anal angle, sometimes entire, sometimes twice interrupted ; fourth broad on costa at four-fifths rapidly narrowing to a point just beyond anal angle ; a yellow spot in disc between second and third fasciæ ; hindmargin edged with dark-fuscous ; cilia on costa first yellow, then dark-fuscous, beyond apex ochreous, towards anal angle bases crimson-red, apical halves dark-fuscous. Hindwings, basal half ochreous-yellow ; apical half dark-fuscous ; cilia dark-fuscous.

This and the following species belong to the natural group of which *H. jucundella*, Walk., is a type. Brisbane ; twelve specimens.

HOPLITICA PYRITES, *n. sp.*

Female, 10 mm. Head pale-yellowish, side-tufts reddish-orange anteriorly ; face whitish, with a reddish-orange transverse line. Palpi whitish, second joint with an apical, terminal joint with a median fuscous ring. Antennæ whitish, sharply annulated with black. Thorax pale crimson, with two pale yellow dots posteriorly. Abdomen fuscous, beneath whitish. Legs whitish : anterior tibiæ pale red ; anterior and middle tarsi annulated with dark fuscous. Forewings elongated, narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded ; pale crimson ; markings pale yellow, outlined with dark fuscous ; a basal band from costa at base, directed obliquely outwards, ending in a rounded extremity beyond fold, not reaching inner margin ; an outwardly curved fascia from costa at one-fourth to inner margin before middle ; an irregular band from inner margin beyond middle, not reaching centre of disc ; a second fascia from middle of costa to anal angle, dilated at centre to contain a pale crimson spot ; a band broad on costa at three-fourths, narrowing to a point above anal angle ; some dark fuscous scales at apex ; cilia pale yellow, with a median orange line at apex ; at anal angle partly fuscous, partly pale crimson. Hindwings whitish, at apex pale fuscous ; cilia whitish, at apex fuscous.

This exquisitely colored and delicate insect is the smallest of the genus. Brisbane ; three specimens.

Lophopepla, *n. g.*

Head with appressed scales, sidetufts moderate, loosely appressed. Antennæ moderate, ciliations in male one and a half, with strong pecten. Palpi moderate, second joint reaching base of antennæ, considerably thickened with scales, somewhat loose beneath, terminal joint shorter than second, moderately stout, recurved. Thorax with small posterior crest. Forewings moderate, apex somewhat acute, hindmargin oblique, almost straight; with tufts of raised scales on disc. Hindwings narrower than forewings; cilia two-thirds. Abdomen moderate. Forewings with vein seven to hindmargin; vein two much curved from before angle of cell. Hindwings normal.

Of uncertain affinity, but seems on the whole to be nearest to *Eochrois*, Meyr., differing in the thoracic crest, and raised tufts of scales on forewings.

Lophopepla igniferella, *Walk.*

Hypercallia igniferella, Walk. (Brit. Mus. Catalogue, XXIX., 670.)

Male and female, 14-16 mm. Head and face ochreous-whitish, apices of sidetufts crimson-red. Palpi whitish, second joint with a median and apical crimson ring; terminal joint with a median and subapical crimson ring. Antennæ whitish. Thorax pale-yellow, mottled with crimson-red spots; a small bifid posterior crest crimson-red. Abdomen ochreous-whitish. Legs whitish; anterior pair crimson-red, tarsi annulated with whitish. Forewings moderate, costa gently arched, apex tolerably acute, hindmargin oblique, almost straight; vivid crimson-red; costal edge pale yellowish; with very numerous irregularly distributed small pale-yellow spots, sometimes partly confluent; a fuscous dot on costa near base; a narrow oblique dark-fuscous line from costa at one-fourth to inner-margin beyond middle—on this are a few scattered scales with metallic lustre; a second line beneath costa, with which it is connected at one-half and three-quarters, thence prolonged to anal angle; a third line parallel and near hindmargin; cilia pale-yellow, with an interrupted median crimson line. Hindwings and cilia ochreous-whitish.

Unsurpassed in brilliancy of coloring. Walker's description refers without doubt to this species. Brisbane; not uncommon.

Eulechria, *Meyr.*

The following are taken in the neighborhood of Brisbane:—*E. concictella*, Walk.; *E. cranimis*, Meyr. (?); *E. pallidella*, Meyr.; *E. triferella*, Walk.; *E. brachypepla*, Meyr.; *E. transversella*, Walk.; *E. philotherma*, Meyr.; *E. calotropha*, Meyr.; *E. philostaura*, Meyr.; *E. xylopterella*, Walk.; *E. mesophragma*, Meyr. (?); *E. delotis*, Meyr.

Meyrick also records *E. epicausta*, Meyr., from Helidon. The identification of two of the species in the above list is not quite certain. The form attributed to *E. mesophragma*, Meyr., may be either a local variety or a new species. There are certainly many more species of this genus to be discovered here. I have several apparently new species besides those given below, but do not propose to describe them at present.

EULECHRIA STIGMATOPHORA, *n. sp.*

Male, 16-19 mm. Head and face pale ochreous. Palpi ochreous-whitish, second joint with an indistinct fuscous subapical ring, terminal joint fuscous anteriorly. Antennæ ochreous-fuscous. Thorax pale whitish-brown, sometimes with a broad fuscous central transverse line. Abdomen pale whitish-brown. Legs ochreous-whitish; anterior tibiæ and tarsi ochreous-fuscous. Forewings hardly dilated, costa moderately arched, apex rounded, hindmargin moderately oblique, strongly rounded; pale whitish-brown with conspicuous blackish-fuscous dots; a dot at base of costa, and a second in costal portion of disc near base; a dot in disc before middle, a second in disc beyond middle, and a third on fold obliquely beyond first; a row of four subcostal dots between two-fifths and five-sixths, usually distinct, with a fifth just below fourth; a row of dots close to hindmargin, from beneath apex to beyond anal angle; hindmarginal edge sometimes very faintly pinkish-tinged; cilia pale whitish-brown. Hindwings grey; cilia grey with a pale basal line.

Allied to *E. convictella*, Walk. Brisbane; four specimens.

EULECHRIA BARYPTERA, *n. sp.*

Male, 23-26 mm.; female, 30-32 mm. Head and face whitish, faintly ochreous-tinged; apices of sidetufts sometimes fuscous. Palpi whitish; apical half of second joint and terminal joint fuscous anteriorly. Antennæ whitish. Thorax white, irrorated with dark fuscous. Abdomen whitish-grey, with a tawny-fuscous band on each segment; beneath whitish. Legs whitish, anterior pair fuscous. Forewings rather elongate, oblong, costa strongly arched at base, thence almost straight, apex rounded, hindmargin obliquely rounded; white, in parts ochreous-tinged, irrorated with dark-fuscous scales; markings fuscous; a triangular blotch, paler in centre, at base of costa, sharply limited at fold; an irregular blotch with white centre, or partly obsolete, on inner-margin from one-fourth to one-half, its apex reaching to fold; a dot in disc at one-third, a second below this on fold, forming apex of inner-marginal blotch, a third above middle of disc, and two spots usually confluent forming a semilunar mark, in disc at two-thirds; a triangular blotch on centre of costa,

sometimes indistinct ; a broad inwardly oblique streak from costa at five-sixths, from which a strongly outwardly-curved dentate line is continued to anal angle ; a row of small dots along hind-margin ; cilia whitish-grey, with an interrupted median-fuscous line. Hindwings grey, whitish towards base ; cilia grey, with a pale basal line.

In the female the markings are less distinct, and the basal triangular blotch obsolete.

The largest species of the genus, allied to *E. philostaura*, Meyr. Brisbane ; not uncommon.

Eulechria euchlora, *n. sp.*

Female, 24 mm. Head and face grey. Palpi fuscous ; apex of second joint whitish. Antennæ fuscous. Thorax grey, greenish-tinged, anterior margin dark fuscous. Abdomen whitish-ochreous ; a broad reddish-fuscous band in central portion of each segment ; beneath whitish-ochreous. Legs whitish ; anterior and middle tibiæ and tarsi fuscous. Forewings oblong, costa moderately arched at base, thence almost straight, apex rounded, hind-margin obliquely rounded ; whitish irrorated with greenish-grey scales ; a dark fuscous dot at base of inner margin ; a very short dark fuscous line in costal portion of disc near base ; indications of an outwardly oblique greenish-grey fascia from costa at one-fourth, only reaching to fold, and the commencement only of a similarly oblique mark on middle of costa; an oblique dark fuscous mark in disk before middle representing first discal dot ; a longitudinally elongate dot above middle of disc ; two dots in disc at two-thirds tending to join to form a semilunar mark ; an inwardly oblique line from costa at five sixths, from which is continued a strongly outwardly curved interrupted line to anal angle ; cilia grey, paler towards apices. Hindwings and cilia grey.

Distinguishable by its greenish-grey colouring. Belongs to the same group as the preceding. Brisbane ; one specimen.

Eulechria curvilinea, *n. sp.*

Male and female, 12-16 mm. Head and face white. Palpi white, basal two-thirds of second joint fuscous. Antennæ fuscous, obscurely annulated with whitish. Thorax white, anterior margin broadly fuscous. Abdomen ochreous-fuscous. Legs ochreous whitish ; anterior pair, middle tibiæ, and tarsi ochreous-fuscous, the last obscurely annulated with ochreous-whitish. Forewings hardly dilated, costa gently arched, apex rounded, hindmargin obliquely rounded ; white, sparsely irrorated with ochreous-fuscous scales ; a fuscous spot at base of costa, produced along costal edge ; a rather narrow, curved, inwardly oblique fascia, sometimes obsolete at both extremities, from middle of

costa to inner-margin just before middle, ochreous-fuscous; a broader ochreous-fuscous fascia from costa at four-fifths to anal angle, anterior margin strongly convex, posterior concave or nearly straight, ill-defined; a row of three or four ochreous-fuscous dots, sometimes confluent, parallel to lower two-thirds of hindmargin; hindmarginal edge irregularly fuscous; cilia ochreous-whitish, with an interrupted median fuscous line. Hindwings and cilia grey.

Allied to *E. brachypepla*, Meyr., from which it may be distinguished by the anterior dark margin of thorax, and inwardly oblique curved anterior fascia. Common about Brisbane.

EULECHRIA TETRAPLOA, *n. sp.*

Male, 13 mm. Head and face white. Palpi white, basal two-thirds of second joint ochreous-fuscous. Antennæ fuscous, basal joint white. Thorax white, with a transverse ochreous-fuscous line posterior to middle. Abdomen ochreous-fuscous, tuft ochreous-whitish. Legs ochreous-fuscous. Forewings not dilated, costa gently arched, apex round-pointed, hindmargin very obliquely rounded; white, with three fasciæ and an hindmarginal blotch ochreous-fuscous; first fascia at base, very distinct; second rather narrow, straight, inwardly oblique, from costa at two-fifths to inner margin at two-fifths, strongly dilated on both margins; third broader, from costa before apex to anal angle, produced along costa towards apex, anterior margin convex, posterior sinuate; hindmarginal blotch triangular, very distinct, from just below apex to just above anal angle; cilia white, opposite hindmarginal blotch and at anal angle irrorated with fuscous. Hindwings and cilia grey.

Allied to *E. brachypepla*, Meyr., from which it may be distinguished by the differently shaped fasciæ and the hindmarginal blotch. From *E. epicausta*, Meyr., it may be distinguished by the inwardly oblique anterior fascia; and from *E. schalidota*, Meyr., by the thorax being white anteriorly. Brisbane; one specimen.

OENOCHROA, *Meyr.*

I have taken *O. latella*,* Walk., and *O. homora*, Meyr., m.s., near Brisbane, and have bred both species, the former from *Eucalyptus*, the latter from *Acacia*.

OENOCHROA OCHROSOMA, *n. sp.*

Female, 17-18 mm. Head and face whitish-grey. Palpi whitish-grey, terminal joint fuscous. Antennæ fuscous. Thorax

* In Walker's Catalogue this stands as *lactella*, which is doubtless a printer's error.

dark fuscous, with an irregular central whitish-grey blotch. Abdomen pale ochreous. Anterior and middle legs dark fuscous, middle tibiæ and tarsi annulated with whitish-grey; posterior legs ochreous whitish, tarsi fuscous. Forewings elongate, costa moderately arched, apex rounded, hindmargin very oblique; dark fuscous irregularly irrorated with whitish-grey scales; a whitish fascia from costa at one-fourth to inner margin at one-fourth, anteriorly concave, posteriorly convex, moderately broad on costa, narrowing towards inner margin; basal area of disc, and a transverse band beyond fascia free from whitish scales; a dark dot or crescent in disc beyond middle, and a dark line from costa at four-fifths to anal angle, sharply angulated in disc; cilia dark fuscous-grey. Hindwings pale ochreous-yellow; extreme apex pale fuscous; cilia pale fuscous.

Distinguished from all except *O. latella*, Walk., by the yellow hindwings. Brisbane; two specimens in August.

Oenochroa gnophodes, *n. sp.*

Male, 14 mm. Head, palpi, and antennæ slaty-grey. Palpi with second joint markedly dilated at apex, forming an incipient tuft. Antennal ciliations in male rather long (2). Thorax dark fuscous, with a central median band pale slatey-grey; shoulders pale slatey-grey. Abdomen fuscous. Legs whitish; anterior and middle tibiæ and tarsi dark fuscous. Forewings elongate, narrow, costa slightly arched, apex round-pointed, hindmargin very oblique; whitish-slaty-grey; markings dark fuscous, rather obscure; an inwardly oblique fascia from costa at one-third to inner margin at one-fourth; anterior to this some obscure confluent dark markings; indications of an interrupted fascia from costa at four-fifths to anal angle; a series of dark fuscous dots on hindmargin; cilia fuscous, irrorated with pale whitish-slaty-grey. Hindwings pale grey, darker towards hindmargin; cilia, grey. Brisbane; one specimen.

Placocosma, *Meyr.*

Placocosma anthopetala, *Meyr.*

Brisbane.

Placocosma phaeina, *n. sp.*

Male, 12 mm. Head and face snow-white, side-tufts tinged with fuscous. Palpi snow-white; second joint with a fuscous subapical ring; terminal joint fuscous anteriorly and at apex. Antennæ white, with dark fuscous annulations, basal joint fuscous. Thorax snow-white, apex of crest golden-ochreous. Abdomen ochreous. Legs whitish-ochreous; anterior tibiæ fuscous, anterior tarsi annulated with fuscous. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very

obliquely rounded ; snow - white ; with three golden - ochreous fasciæ, first slightly outwardly oblique from costa near base to inner margin at one-sixth, of equal thickness throughout ; second from costa at three-fifths to anal angle, somewhat dilated on costa, and constricted in disc ; third from apex parallel to hindmargin, ending in a point above anal angle ; hindmarginal edge white ; cilia fuscous at apex ; thence golden-ochreous. Hindwings grey ; cilia ochreous.

Distinct and easily recognised. Brisbane ; one specimen taken by Mr. Illidge.

Linosticha, *Meyr.*

Linosticha albida, *n. sp.*

Male and female, 11-15 mm. Head, face, and thorax white. Palpi white ; basal two-thirds of second joint pale ochreous-fuscous. Antennæ white. Abdomen ochreous-whitish. Legs ochreous-whitish. Forewings elongate, costa moderately arched, apex acute, hindmargin very oblique : white ; with a few scattered fuscous scales ; posterior portion of disc and along principal veins faintly ochreous-tinged ; cilia ochreous-whitish. Hindwings and cilia white, faintly ochreous-tinged.

Brisbane ; nine specimens.

Phlœopola, *Meyr.*

The following are taken near Brisbane :—*P. turbatella*, Walk.; *P. psephophora*, Meyr.; *P. melanodelta*, Meyr.

Phlœopola subviridella, *n. sp.*

Male, 16-19 mm. Head fuscous, face whitish. Palpi fuscous, second joint irrorated with whitish scales, and with a narrow white apical ring. Antennæ whitish, barred above with fuscous. Thorax fuscous ; apex of crest and of shoulders white. Abdomen pale ochreous-fuscous. Legs whitish ; anterior and middle tibiæ and tarsi fuscous, with whitish annulations. Forewings elongate, posteriorly moderately dilated, costa gently arched, apex rounded, hindmargin obliquely rounded ; whitish, irregularly irrorated with greenish-grey and fuscous scales, which give rise to markings ; a dark fuscous dot at base of costa, a second at base of hindmargin, and a very short narrow dark line in disc outside fold close to base ; a dark-fuscous dot in disc before middle, a second beyond middle, and a third on fold immediately below first ; there is a tendency to form transverse fasciæ of greenish-grey scales, including the first two dots—these are best marked on costa as dark-greenish-grey dots ; a third costal dot just before apex ; cilia pale-greenish-grey, bases whitish. Hindwings pale-fuscous, whitish towards base ; cilia whitish, at apex fuscous.

Best distinguished by the greenish tint of the forewing. Brisbane ; two specimens.

Phlœopola eucapnodes, *n. sp.*

Female, 13-18 mm. Head and face whitish. Palpi whitish; base of second joint and a subapical band dark fuscous; terminal joint with a median dark fuscous band. Antennæ dark fuscous. Thorax dark fuscous, apex of crest and shoulders whitish. Abdomen ochreous-fuscous. Legs ochreous-whitish; anterior tibiæ and tarsi banded with dark fuscous. Forewings elongate, dilated posteriorly, costa gently arched, apex rounded, hindmargin obliquely rounded; white irrorated with fuscous; a dark fuscous dot at base of costa, a second at base of inner margin, and a third confluent with first in basal part of disc; an irregular dark fuscous fascia from costa at one-fourth to inner margin before middle, interrupted in costal part of disc, strongly dilated on inner margin, and enclosing a blackish dot on fold; a dark fuscous blotch on costa beyond middle, connected by a blackish dot with another dark fuscous blotch on anal angle to form a complete fascia; a dark fuscous blotch on costa before apex, with a suffused line toward anal angle; hindmarginal edge mostly dark fuscous; cilia fuscous, at lower half of hindmargin irrorated with white. Hindwings and cilia fuscous.

Brisbane; two specimens.

Phlœopola basigramma, *n. sp.*

Male, 13-21 mm. Head white, anterior part of side-tufts sometimes fuscous; face white. Palpi, basal half of second joint dark fuscous, apical half white; terminal joint white, with an indistinct fuscous band before middle. Antennæ ochreous-fuscous. Thorax dark fuscous, apex of crest and of shoulders white. Abdomen ochreous, beneath whitish. Legs whitish; anterior and middle tibiæ and tarsi fuscous with whitish annulations. Forewings elongate, dilated posteriorly, costa gently arched, apex rounded, hindmargin obliquely rounded; white, irrorated with greyish scales, costal edge and posterior part of disc tinged with pale ochreous; a thick blackish streak from base of costa along fold to one-third, on the centre of the outer surface of this is a blackish projection; from apex of streak a fuscous shade extends to inner margin at two-fifths; a blackish dot on costa at one-third; a blackish dot in disc before middle, a second beyond middle obliquely below first; a straight, dark fuscous fascia from costa at two-thirds to anal angle, containing a black dot on costa and a second in disc; a dark fuscous inwardly oblique spot on costa before apex, from which a fine outwardly curved line is continued to anal angle; hindmarginal edge narrowly fuscous; cilia whitish. Hindwings whitish, suffused with fuscous, especially at apex; cilia towards apex fuscous, with a whitish basal line, towards anal angle whitish.

Distinguished from all but *P. semocausta*, Meyr., by the dark basal line along fold. Brisbane; six specimens.

PHLŒOPOLA MELANOSPILA, *n. sp.*

Male and female, 17-29 mm. Head and face ochreous-fuscous. Palpi ochreous-whitish irrorated with dark fuscous scales, terminal joint dark fuscous except at apex. Antennæ ochreous-fuscous, obscurely annulated with dark fuscous; ciliations two-thirds. Thorax ochreous-fuscous. Abdomen ochreous-fuscous. Legs ochreous-fuscous, tarsi banded with dark fuscous; anterior tibiæ dark fuscous. Forewings moderate, somewhat dilated posteriorly, costa gently arched, apex rounded, hindmargin obliquely rounded; reddish-ochreous fuscous, with scattered whitish and dark fuscous scales; markings blackish-fuscous; a large basal blotch extending from base of costa to two-thirds of inner margin, with a rounded or toothed projection into disc above fold; in the male the basal blotch is uniformly blackish fuscous, in the female partly obscured by the ground-colour, its posterior edge partly bordered with whitish; a suffused spot on costa at one-third; a distinct white-bordered dot in disc at one-third; a large pentagonal blotch from costa at two-thirds, reaching more than half across disc; a short whitish-bordered longtitudinal line between this and basal blotch, below which is a fuscous suffusion; a suffused spot below costa near apex, from which proceeds a curved series of whitish-bordered dots to near anal angle; cilia whitish-ochreous, with a median fuscous line. Hindwings fuscous-grey; cilia fuscous-grey with an indistinct darker line.

Nearest to *P. melanodelta*, Meyr, but is a much larger insect. Brisbane; six specimens.

PHLŒOPOLA EUPREPES, *n. sp.*

Male, 15 mm. Head and face very pale ochreous-white. Palpi whitish; second joint dark fuscous at base, and with an indistinct subapical fuscous ring; terminal joint with a broad fuscous band before middle. Antennæ blackish, in male with incipient serrations. Thorax blackish-fuscous, a few scattered scales and apex of crest whitish. Abdomen ochreous. Legs ochreous-whitish: anterior and middle tibiæ and tarsi dark fuscous, annulated with whitish. Forewings elongate, posteriorly dilated, costa moderately arched, apex rounded, hindmargin obliquely rounded; very pale ochreous-white, with a few scattered dark fuscous scales; markings dark fuscous; a squarish spot at base of costa; a short very narrow streak near inner margin at base; a broad fascia from costa at one-fourth to middle of inner margin, dilated on fold and broadly dilated on inner margin, costal edge between

this and basal spot is dark fuscous; a second fascia on costa beyond middle to anal angle, very broad on costa, then narrowing and almost interrupted in disc, being connected by a very short oblique bar with a rounded blotch above anal angle; between first and second fascia is a round dot in centre of disc; a third fascia commences by a broad band directed obliquely inwards from costa just before apex, and is continued by a fine line, first obliquely outwards, and then bent sharply and continued parallel to hindmargin to anal angle, where it joins second fascia: a dark fuscous line along hindmargin; cilia, bases barred alternately with whitish and dark fuscous, apices pale fuscous. Hindwings pale fuscous, darker towards apex; cilia fuscous.

A very neat and distinct species. Brisbane: two fine specimens.

PHLŒOPOLA LEUCOCEPHALA, *n. sp.*

Male and female, 13-18 mm. Head and face snow-white. Palpi white, base of second joint and apical one-half or two-thirds of terminal joint dark-fuscous. Antennæ white, sharply annulated with dark-fuscous. Thorax dark-fuscous, shoulders and crest snow-white. Abdomen ochreous. Legs whitish-ochreous; anterior and middle tibiæ and tarsi dark-fuscous, annulated with ochreous-whitish. Forewings elongate, not dilated posteriorly, costa gently arched, apex round-pointed, hindmargin obliquely rounded; snow-white, markings dark-fuscous; a very small spot at base of costa; an inwardly curved streak from inner-margin near base, joining first fascia near costa; a broad oblique fascia from costa at one-fourth to middle of inner-margin; narrower on costa, dilated on inner-margin; a second fascia from costa just beyond middle to anal angle, both fasciæ with irregularly dentate margins; a third broad fascia from costa near apex, inwardly oblique, and coalescing with second at anal angle; cilia white, bases barred with dark-fuscous. Hindwings and cilia dark-grey.

In this species vein seven of forewings is to hindmargin. It appears nearly allied to *P. synchyta*, Meyr. Brisbane; six specimens.

SPHYRELATA, *Meyr.*

S. ochrophœa, Meyr., and *S. melanoleuca*, Meyr., are taken about Brisbane.

PILOPREPES, *Meyr.*

The following are taken in the neighborhood of Brisbane:—*P. æmulella*, Meyr.; *P. aristocratica*, Meyr.; *P. lophoptera*, Lower (Trans. Royal Soc., S.A., 1894).

PILOPREPES LUCASII, *n. sp.*

Male, 17-18 mm. Head snow-white, apices of sidetufts orange-fuscous. Face snow-white. Palpi white, apex of terminal joint fuscous. Antennæ white, obscurely annulated with pale-fuscous. Thorax white, more or less irrorated or marked with orange-fuscous, with a posterior dark-fuscous spot; crest orange-fuscous. Abdomen pale-ochreous. Legs whitish; anterior tibiæ and tarsi densely clothed with long hairs, white suffused with grey. Forewings moderate, not dilated, costa moderately arched, slightly dilated with scales at one-half, apex rounded, hindmargin very obliquely rounded; a snow-white basal patch, posterior margin well-defined, from costa at one-fourth obliquely outwards to fold, thence angulated inwards to inner-margin at two-fifths, in this margin are two very prominent tufts of raised scales, one at fold, the other between fold and costa; a dark-fuscous spot at base of costa, and another at base of inner-margin; the white basal patch also contains a purplish-grey transverse band from inner-margin not reaching costa, often broken up into spots, and a pale-ochreous suffusion between this and base near inner-margin, median area of disc purplish-grey, bounded by a line from costa at two-thirds to anal angle, indented in disc and at anal angle; within this is a narrow interrupted white line from costa before middle to inner-margin before anal angle, its outer-margin suffused with orange-fuscous; remainder of disc white, with an interrupted ochreous line along costa, and a subapical orange-fuscous blotch, and a line of fuscous dots along hindmargin; cilia ochreous-whitish, at anal angle dark-fuscous. Hindwings ochreous-yellow; cilia ochreous-yellow suffused with pale-fuscous.

Very distinct. Brisbane, two specimens; first taken by Dr. T. P. Lucas.

PILOPREPES GLAUCASPIS, *n. sp.*

Male, 16 mm. Head white, anterior part of side-tufts reddish-brown. Face white. Palpi whitish, apex of second joint, and all terminal joint except base fuscous. Antennæ whitish; ciliations three. Thorax white, anterior part fuscous. Abdomen ochreous-whitish. Legs ochreous; anterior and middle tibiæ and tarsi white, barred with fuscous. Forewings moderate, costa moderately arched at base, with a strong tuft of scales at one-half, thence straight, apex rounded, hindmargin obliquely rounded; white, with scattered, pale reddish-brown scales; a dark fuscous spot at base of costa, and a second in disc close to first; central portion of disc occupied by a large olive-green blotch, which commences in a dark fuscous dot on costa at one-third, rapidly widens in disc, and on inner margin reaches from one-third to just before anal angle, its anterior margin concave, posterior

margin convex, white bordered ; beyond this disc is pale reddish brown, darker towards hindmargin, and contains a curved line of obscure fuscous dots ; costal tuft dark fuscous ; cilia grey, bases barred with fuscous, at anal angle white. Hindwings and cilia grey.

Conspicuously distinct. The antennal ciliations are very long for this genus, but I do not think it necessary to separate it. Vein seven of forewings is distinctly to apex, and the costal tuft is characteristic. One specimen ; taken near Brisbane by Mr. Illidge.

TERATOMORPHA, *n. g.*

Head with appressed scales, sidetufts moderate, closely appressed. Antennæ moderate, basal joint stout, pecten absent, ciliations in male unknown. Palpi very long ; second joint very long, horizontally porrected, with a brush-like projection of long scales on inferior margin from one-third to apex, and a smaller brush on middle third of superior margin ; terminal joint shorter, ascending, its middle third thickened with loose scales, apical third smooth, apex acute. Thorax with a posterior crest. Forewings moderate ; costa with tufts of scales ; hindmargin sinuate, not oblique ; disc with strong tufts of raised scales. Hindwings as broad as forewings, ciliations one-fourth. Abdomen (broken). Anterior tibiæ but slightly thickened. Forewings with vein 7 to costa, 2 from before angle of cell. Hindwings normal.

Perhaps an extreme development of *Piloprepes*.

TERATOMORPHA COELIOTA, *n. sp.*

Female, 27-30 mm. Head and face ochreous-whitish. Palpi whitish ; second joint irrocated with fuscous scales, except on tufts ; terminal joint with a broad dark-fuscous ring before middle, a small fuscous ring beyond middle, and a third at apex. Antennæ whitish with fuscous annulations. Thorax ochreous-whitish with a few dark fuscous scales. Legs ochreous-whitish banded with fuscous. Forewings elongate-oblong, costa excavated in middle and again bafore apex, before each excavation is a strong tuft of scales, apex rounded, hind-margin sinuate not oblique ; ochreous-whitish ; a broad dark-fuscous band, partly interrupted by ground-color, from costa at one-sixth, towards, but ceasing abruptly before, middle of disc ; a few scattered dark-fuscous scales ; a dark-fuscous blotch at apex ; in oblique light some of the fuscous scales have a metallic iridescence ; cilia fuscous. Hindwings ochreous-whitish ; a dark-fuscous spot at apex ; cilia ochreous-whitish, at apex fuscous.

This curious species is evidently a mimic of birds' droppings.

Bowen, North Queensland, two specimens in the collection of the Brisbane Museum.

PHYLLOPHANES, *n. g.*

Head loosely haired, sidetufts moderate, spreading. Antennæ moderate, basal joint stout, pecten absent, ciliations in male unknown. Palpi rather long, second joint somewhat exceeding base of antennæ, densely scaled beneath, scales forming a large apical tuft, terminal joint much shorter, moderate, recurved. Thorax smooth. Forewings moderate, apex pointed, hindmargin only slightly oblique, with a strong tuft of scales on costa. Hindwings narrower than forewings, cilia at apex long forming a hook-like projection, basal cilia one-half. Abdomen moderate. Anterior tibiæ not dilated. Forewings with vein seven to apex, two from before angle of cell. Hindwings normal.

The tufted palpi recalls *Palparia*, and the costal tufts *Piloprepes*, but I doubt whether it is really closely related to either genus.

PHYLLOPHANES DYSEURETA, *n. sp.*

Female, 22 mm. Head, face, and thorax whitish, irrorated with reddish-brown. Palpi anteriorly reddish-brown, posteriorly whitish; terminal joint with a median white ring; tuft two-fifths length of terminal joint. Antennæ pale-fuscous. Abdomen whitish grey. Legs ochreous-whitish; anterior tibiæ and tarsi reddish-brown. Forewings elongate oblong, costa moderately arched, strongly dilated with scales before middle, apex pointed, subrectangular, hindmargin slightly oblique, lower half obliquely rounded; whitish thickly irrorated with reddish-brown scales; a few fuscous scales in disc, on fold, and about anal angle; cilia whitish. Hindwings whitish-grey; cilia whitish, apical tuft fuscous, from this a median fuscous line can be traced for a short distance.

Not like any other species. When the wings are closed the apical tufts of hindwings project beneath costa of forewings, giving the appearance of a second costal tuft. The moth then closely resembles a piece of crumpled leaf. Brisbane; one specimen from *Eugenia*.

PYCNOCERA, *n. g.*

Head with appressed scales, side-tufts moderate, closely appressed. Antennæ moderately long, in male very much thickened, serrate (one-third), and densely ciliated (one and a half); with strong pecten. Palpi rather short, second joint not reaching base of antennæ, with appressed scales. terminal joint less than half first, moderately stout, recurved. Thorax smooth. Forewings moderate, hindmargin scarcely oblique, rounded beneath. Hindwings narrower than forewings; cilia one-third. Abdomen rather stout. Forewings with vein seven to hindmargin, two from just before angle of cell. Hindwings normal.

Immediately distinguished by the greatly thickened antennæ of the male.

PYCNOCERA HYPOXANTHA, *n. sp.*

Male, 21-23 mm. Head, face, and palpi ochreous-fuscous. Antennæ dark fuscous. Thorax fuscous. Abdomen fuscous, apical tuft and basal tufts ochreous. Legs fuscous, anterior and middle tibiæ and tarsi annulated with ochreous; posterior tibiæ and tarsi ochreous. Forewings oblong, not dilated, costa moderately arched, apex rounded, hindmargin scarcely oblique, rounded beneath; dark fuscous thickly irrorated with whitish scales, towards inner margin and about centre of disc these are less numerous or wanting; an oval dark fuscous blotch from anal angle, nearly reaching costa at two-thirds; a narrow fuscous line from costa at five-sixths, confluent with blotch at anal angle; cilia fuscous. Hindwings, basal half clear ochreous-yellow; apical and hindmarginal portions fuscous; cilia fuscous with paler basal line, at anal angle ochreous-yellow.

Brisbane; three male specimens.

NEPHOGENES, *Meyr.*

Nephogenes fœdatella, Walk. Brisbane.

Nephogenes atmopis, Meyr. Taken by Meyrick at Toowoomba

NEPHOGENES VARIABILIS, *n. sp.*

Male, 19-23 mm. Head and face ochreous-whitish Palpi ochreous-whitish, second joint sometimes partly suffused with fuscous. Antennæ whitish, sometimes annulated with fuscous, basal joint fuscous; ciliations in male two and a-half. Thorax pale ochreous-whitish, more or less suffused with fuscous; anterior half of shoulders fuscous. Abdomen ochreous-whitish. Legs ochreous-whitish; anterior and middle tibiæ and tarsi dark fuscous, annulated with whitish. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; very pale ochreous-whitish, more or less irrorated with fuscous; markings fuscous; a triangular patch on costa before middle, reaching one-third across disc; a dot in disc at one-third, a second slightly beyond this on fold, a third at apex of costal triangle, and several confluent, forming a semilunar mark in disc at two-thirds; a short, inwardly oblique streak from costa at five-sixths, from which proceeds a line sharply bent in disc, and continued parallel to hindmargin to above anal angle, where it sometimes ends in a fuscous spot, but this is only occasionally present; a series of fine dots around apical and hindmarginal edge; cilia whitish, with two fuscous lines, sometimes interrupted or obsolete. Hindwings pale grey, darker towards apices; cilia whitish, with a pale grey line at one-third.

A variable species. The above description is taken from ten specimens, all males, of which scarcely two are exactly alike. They include two well-marked varieties ; in (1) the costal triangle is very well marked, and there is an equally distinct fuscous line along central half of inner-margin, discal dots and posterior line are obsolete, the latter being represented by a conspicous blackish spot above anal angle ; in (2) the disc and more especially its basal portion are extensively suffused with fuscous, and an inwardly concave fuscous shade unites the two extremities of the posterior line.

In the narrow forewings it resembles *N. apora*, Meyr., from which it may be distinguished by the somewhat ochreous-tinged forewings. From other species it may also be distinguished by the absence of any basal patch or fascia (except in conjunction with a general fuscous suffusion). The long antennal ciliations of the male are also a point of distinction. Brisbane ; not uncommon.

Philobota, *Meyr.*

This large genus is conspicuously poorly represented in the neighbourhood of Brisbane. I am able to record the following :— *P. chionoptera*, Meyr.; *P. pruinosa*, Meyr.; *P. adaptatella*, Walk.; *P. xanthiella*, Walk.; *P. fasciulis*, Fab.; *P. tentatella*, Walk.; *P. melanoploca*, Meyr.; *P. pulverea*, Meyr.

Three additional species have been taken on Stradbrooke Island :—*P. irruptella*, Z.; *P. chrysopotama*, Meyr.; *P. pretiosella*, Walk.

Meyrick records *P. erebodes*, Meyr., and *P. calamœa*, Meyr., from Toowoomba.

Philobota xipheres, *n. sp.*

Male, 19-20 mm. Head and face white, very faintly ochreous-tinged. Palpi, antennæ, and thorax white. Abdomen whitish-grey. Legs whitish-ochreous. Forewings moderate, not dilated, costa gently arched, apex round-pointed, hindmargin very obliquely rounded ; snow-white ; a fuscous streak along costa almost to apex, attenuated at base and extremity ; cilia white. Hindwings and cilia grey.

Closely resembles the male of *P. chionoptera*, Meyr, but may be at once distinguished by the much darker hindwings. Brisbane ; two specimens.

Philobota lonchota, *n. sp.*

Male, 18 mm. Head, face, and thorax ochreous. Palpi anteriorly and externally fuscous, posteriorly and internally ochreous. Antennæ fuscous. Abdomen ochreous. Legs ochreous ; anterior and middle tibiæ and tarsi fuscous. Forewings moderate, not dilated, costa gently arched, apex round-pointed, hindmargin

obliquely rounded ; ochreous-whitish ; a dark fuscous streak along costa to three-fourths, attenuated at base and extremity ; cilia ochreous-whitish. Hindwings and cilia grey.

Distinguished from the preceding by the ochreous-tinged forewings, and shorter costal streak. Brisbane ; two specimens.

Philobota perixantha, *n. sp.*

Male, 18-19 mm.; female, 25-27 mm. Head and face ochreous. Palpi whitish-ochreous. Antennæ whitish, ciliations two. Thorax white. Abdomen ochreous-whitish. Legs ochreous-whitish : anterior and middle tibiæ and tarsi suffused with fuscous. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin obliquely rounded ; white ; base of costa dark fuscous ; costal and hindmarginal edges narrowly ochreous ; cilia ochreous. Hindwings pale grey ; cilia whitish-ochreous.

Brisbane ; taken commonly.

Philobota orphnites, *n. sp.*

Male, 17-22 mm.; female, 23-25 mm. Head and face white. Palpi whitish, anterior surface of second joint except apex, and of terminal joint pale fuscous. Antennæ whitish. Thorax white. Abdomen whitish. Legs whitish. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin obliquely rounded ; white ; basal fifth of costal edge dark fuscous; some pale fuscous suffusion along costa ; discal dots dark fuscous, first at one-third, second obliquely beyond first on fold, third beyond second above fold often absent, fourth above centre of disc, and three others forming a crescent at two-thirds ; an inwardly oblique streak from costa at five-sixths, sharply bent in disc and continued as a series of fine dots parallel to hindmargin to anal angle, this posterior line is often obsolete ; a series of dots often obsolete along apical sixth of costa and hindmargin ; cilia whitish. Hindwing and cilia whitish-grey.

Brisbane ; taken commonly.

Philobota orphnæa, *n. sp.*

Male and female, 17-20 mm. Head and face ochreous-whitish. Palpi ochreous-whitish, basal half of anterior surface of second joint sometimes fuscous. Antennæ ochreous-fuscous. Thorax ochreous-whitish, with a transverse fuscous band. Abdomen ochreous-fuscous. Legs ochreous-whitish. Forewings moderate, posteriorly dilated, costa gently arched, apex round-pointed, hindmargin obliquely rounded ; ochreous-whitish ; more or less suffused with fuscous scales—these sometimes form an irregular blotch in centre of disc above fold ; a fuscous dot before middle of disc, a second beyond middle, and a third on fold obliquely

below first; a more or less obsolete broken fuscous line from costa at five-sixths parellel to hindmargin to before anal angle; cilia ochreous-whitish. Hindwings and cilia grey.

Brisbane; taken commonly.

PHILOBOTA LUNATA, *n. sp.*

Male and female, 16-18 mm. Head anteriorly snow-white, posteriorly dark-fuscous. Face snow-white. Palpi, basal third of second joint dark-fuscous, remainder snow-white; terminal joint fuscous anteriorly, white posteriorly. Antennæ dark-fuscous. Thorax snow-white, anterior margin dark-fuscous. Abdomen ochreous. Legs ochreous-whitish; anterior tibiæ and tarsi fuscous. Forewings moderate, not dilated, costa gently arched, apex round-pointed, hindmargin moderately oblique; a snow-white blotch on basal one-third of inner-margin, with a rounded outline extending beyond fold; a fuscous longitudinal bar from base of costa separates this from a triangular costal white blotch, extending on costa from one-fifth to three-fifths, its apex not reaching middle of disc; an oblong inwardly oblique white blotch from costa before apex; a suffusedly outlined white triangular marking at anal angle, and a white line on middle third of hindmargin; remainder of disc fuscous or reddish-fuscous, irrorated with white; cilia dark-fuscous, on middle third of hindmargin and at anal angle pure white. Hindwings ochreous, irrorated with fuscous towards apex; cilia pale-ochreous, at apex fuscous.

Brisbane; five specimens.

PHILOBOTA CHRYSANTHES, *n. sp.*

Male and female, 20-22 mm. Head orange-yellow. Face dark fuscous with some orange-yellow scales. Palpi, anterior surface dark fuscous, extreme base of second joint yellow; posterior surface yellow. Thorax fuscous. Abdomen ochreous-fuscous. Legs dark fuscous, posterior tibiæ and tarsi ochreous on upper surface. Forewings moderate, somewhat dilated posteriorly, costa gently arched, apex round-pointed, hindmargin obliquely rounded; deep yellow; base of costa dark fuscous at edge; a fuscous line from centre of base to costa at three-fourths, often obsolete except near base; a second line occasionally present or wholly or partially obsolete from base to anal angle, parallel to and below fold; a fuscous hindmarginal blotch, its anterior margin strongly convex, and enclosing in its lower part a deep yellow spot which may be partly confluent with ground color of disc; cilia dark fuscous. Hindwings dark fuscous; more or less irrorated with yellowish scales; cilia dark fuscous.

Nearest *P. auriceps*, Butler. Ballandean (2,500 feet), near

Wallangarra, Queensland; four specimens in January and February.

PHILOBOTA SOPHIA, *n. sp.*

Male, 19-25 mm. Head orange-yellow. Face dark fuscous. Palpi second joint dark fuscous, apex yellowish; terminal joint pale yellowish. Antennæ dark fuscous. Thorax orange-yellow, with a central fuscous spot. Abdomen dark fuscous, tuft ochreous. Legs dark fuscous; posterior tibiæ and tarsi pale ochreous on upper surface. Forewings elongate, somewhat dilated posteriorly, costa gently arched, apex round-pointed, hindmargin obliquely rounded; white; a broad hindmarginal streak, and middle half of costa orange-yellow; extreme base dark fuscous; from this a broad dark fuscous streak extends at first on, and then just beneath, costa to three-fifths; a similar inwardly oblique streak from costa before middle, terminating abruptly on fold at one-third; between this and base is an orange-yellow streak in costal portion of disc; from oblique streak just above fold proceeds a longitudinal streak twice bent in disc at two-thirds, and prolonged to apex; a streak from before apex to anal angle, sometimes connected with the preceding above anal angle; cilia at apex dark fuscous, thence orange-yellow. Hindwings grey; cilia ochreous.

A very distinct and handsome species, nearer to *P. ida*, Lower. than to any other. Armidale (3500ft.), New South Wales three specimens in October.

PHILOBOTA OCULARIS, *n. sp.*

Male and female, 16-17 mm. Head, face, thorax, and palpi pale yellow. Antennæ greyish. Abdomen grey. Legs fuscous. Forewings moderate, not dilated, costa gently arched, apex round-pointed, hindmargin nearly straight, slightly oblique; pale yellow; costal edge fuscous, darker towards base; a very strongly inwardly-curved fuscous fascia from costa at five-sixths to anal angle; hindmarginal edge narrowly fuscous; cilia fuscous. Hindwings and cilia fuscous-grey.

Differs from the rest of the genus in the short antennal ciliations of the male (one-half); but it does not appear necessary to separate it at present. There is a strong antennal pecten, and second joint of palpi considerably exceeds base of antennæ. Specifically it resembles *Coesyra ocellaris*, Meyr. Charters Towers (Queensland), two specimens in March.

COMPSOTROPHA, *Meyr.*

Compsotropha strophiella, Meyr. Brisbane.

COMPSOTROPHA CHRYSOZONA, *n. sp.*

Male and female, 18-19 mm. Head black ; face yellowish Palpi second joint considerably exceeding base of antennæ, white; terminal joint fuscous. Antennæ (ciliations two) ochreous-whitish, annulated with black. Thorax ochreous-yellow. Abdomen fuscous. Legs ochreous-yellow ; anterior tibiæ fuscous ; posterior tarsi barred above with fuscous. Forewings moderate, costa gently arched, apex round-pointed, hindmargin sinuate, oblique ; ochreous-yellow, towards base deep yellow ; with four blackish-fuscous faciæ ; first occupies basal fifth of disc ; second inwardly oblique from middle of costa to middle of inner margin ; third confluent with second on costa, to anal angle ; fourth along hindmargin from apex to anal angle ; cilia blackish-fuscous at apex and anal angle, along middle third of hindmargin ochreous-yellow. Hindwings dark fuscous ; costal margin and base suffused with orange-yellow ; cilia dark fuscous,

A very distinct insect not nearly related specifically to any other. Brisbane ; four specimens in November.

PHILONYMPHA, *Meyr.*

Philonympa hololenca, Meyr. Brisbane.

PELTOPHORA, *Meyr.*

The following have been taken near Brisbane :—*P. carphalea*, Meyr. ; *P. prorimella*, Walk. ; *P. basiplaga*, Walk. ; *P. conjunctella* Walk. ; *P. privatella*, Walk. ; *P. psammochroa*, Lower.

P. argutella, Z., and *P. marionella*, Newm., have been taken on Stradbrooke Island.

SAROPLA, *Meyr.*

S. cleronoma, Meyr., Brisbane.

S. coelatella, Meyr., is recorded by Meyrick from Toowoomba.

CORETHROPALPA, *n. g.*

Head with loosely appressed scales, side-tufts rather large, meeting above. Antennæ in male moderate, shortly serrated, shortly and evenly ciliated, three-fourths, with moderate pecten. Palpi long, second joint much exceeding base of antennæ, horizontally porrected, clothed anteriorly with long scales expanding above and beneath to form apical tufts, of these the inferior is much the longer ; terminal joint shorter than second, slender, obliquely ascending, partly concealed in apical tuft. Thorax smooth. Forewings elongate, apex pointed, hindmargin very oblique. Hindwings as broad as forewings, elongate-ovate, hindmargin rounded, cilia three-fourths. Abdomen moderate. Posterior tibiæ clothed with long hairs. Forewings with vein

seven to hindmargin, two from before angle of cell. Hindwings normal.

Closely allied to *Phryganeutis*, Meyr., which it resembles in the peculiar palpi, but differs in the short antennal ciliations.

Corethropalpa falcata, *n. sp.*

Male and female, 16-19 mm. Head and face white. Palpi white, inferior tuft almost as long as terminal joint, external surface of second joint fuscous beneath, white above; terminal joint fuscous. Antennæ white above, fuscous beneath. Thorax white; shoulders pale fuscous. Abdomen whitish. Legs whitish. Forewings elongate, narrow, costa gently arched, more strongly towards apex, apex acute, slightly falcate, hindmargin sinuous, very oblique; pale fuscous, with longitudinal white lines along veins; a double costal streak, a strong subcostal streak with branches along venules, a fine median streak with fine streaks along median venules, a rather strong streak in basal part of disc beneath fold; a white line along hindmargin; cilia white with basal and apical dark fuscous lines, and a dark fuscous streak just above apex. Hindwings pale grey; cilia pale grey, apices white, a fuscous basal line in apical half of hindmargin.

Brisbane; observed flying low among grass and herbage in August in numbers. Superficially, its markings resemble those of one of the *Crambidæ*.

Pleurota, *Hb.*

The following are taken about Brisbane:—*P. brevicittella*, Walk.; *P. peloxantha*, Meyr.; *P. psammoxantha*, Meyr.

Cœranica, *Meyr.*

Cœranica isabella, Newm. Brisbane.

Cœsyra, *Meyr.*

The following are taken about Brisbane:—*C. dichroëlla*, Z.; *C. iozona*, Meyr.; *C. cyclotoma*, Meyr.; *C. acrotopa*, Meyr.; *C. ochroptera*, Meyr.; *C. amyloïdes*, Meyr.; *C. ergatis*, Meyr.; *C. zephyrota*, Meyr.; *C. innumera*, Meyr.; *C. leptospila*, Meyr.

Meyrick also records *C. omichlota*, Meyr., from Rosewood; and *C. hemiphragma*, Meyr., from Toowoomba.

Coesyra spectabilis, *n. sp.*

Male, 17 mm. Head pale yellow; face and palpi yellowish. Antennæ fuscous. Thorax dark fuscous. Abdomen fuscous. Legs fuscous. Forewings elongate, costa scarcely arched, apex round-pointed, hindmargin oblique, almost straight; yellow; base narrowly dark fuscous; a broad fuscous hindmarginal band,

bounded anteriorly by an almost straight edge from costa at two-thirds to before anal angle ; almost in the centre of this band is a suffusedly outlined yellow spot ; cilia fuscous. Hindwings and cilia fuscous.

Brisbane ; one specimen taken by Mr. Illidge.

Coesyra dicoela, *n. sp.*

Male and female, 14-16 mm. Head, face, and palpi yellow. Antennæ fuscous. Thorax yellow with an anterior fuscous line. Abdomen dark-grey, beneath whitish-ochreous. Legs whitish-ochreous. Forewings moderate, costa gently arched, apex round-pointed, hindmargin almost straight, oblique ; yellow ; costal edge near base fuscous ; a slender purple-fuscous facia from costa at one-third to inner margin slightly before middle, slightly outwardly curved ; a second similar fascia from costa near apex to anal angle, inwardly curved ; a pale purple-fuscous suffusion along hindmargin ; cilia yellow. Hindwings dark-grey ; cilia dark-grey with a pale basal line.

Allied to *C. anthodora*, Meyr. Brisbane ; five specimens.

Coesyra chrysocolla, *n. sp.*

Male and female, 11-12 mm. Head golden-yellow, face reddish-ochreous. Palpi ochreous-whitish, terminal joint pale fuscous. Antennæ fuscous. Thorax dark fuscous. Abdomen fuscous. Legs whitish-ochreous ; anterior and middle tibiæ and tarsi suffused with fuscous. Forewings elongate, narrow, costa almost straight, apex round-pointed, hindmargin very obliquely rounded ; bright golden-yellow ; a narrow dark fuscous basal fascia, a slender fuscous line along costa ; a broad fuscous hindmarginal band, anterior margin of this slightly convex, from costa at three-fourths to before anal angle ; cilia fuscous. Hindwings and cilia dark-grey.

Brisbane ; two specimens.

Epipyrga, *Meyr.*

E. agaclita, Meyr., is recorded by Meyrick from Rosewood.

Oxythecta, *Meyr.*

O. hieroglyphica, Meyr., and *O. acceptella*, Walker. Brisbane.

Crepidosceles, *Meyr.*

C. eostephana, Meyr., and *C. exanthema*, Meyr. Brisbane.

Ocystola, *Meyr.*

The following have been taken near Brisbane :—*O. thiasotis*, Meyr. ; *O. oxytora*, Meyr. ; *O. acroxantha*, Meyr. ; *O. psamathina*,

Meyr.; *O. monostropha*, Meyr.; *O. paulinella*, Newm.; *O. neurota*, Meyr.

Meyrick records *O. suppressella*, Walk., from Rosewood, and *O. protosticha*, Meyr., from Toowoomba.

PAROCYSTOLA, *n. g.*

Head smooth, side-tufts moderate, loose. Antennæ in male with moderate ciliations (one and a-half); basal joint without pecten, rarely with a few scales only. Palpi rather short; second joint barely reaching base of antennæ, with appressed scales, somewhat loose beneath towards apex; terminal joint shorter than second, moderately slender, recurved. Thorax smooth. Forewings moderate, apex acute, hindmargin straight, oblique. Hindwings elongate-ovate, cilia one. Abdomen moderate. Posterior tibiæ clothed with moderately long hairs above. Forewings with vein seven to hindmargin, two from before angle of cell. Hindwings normal.

A development of *Ocystola*, from which it is distinguished by the absence of the pecten, and the shorter antennal ciliations. The latter character serves to separate it from *Compsotropha*, to which it is not really very closely allied.

PAROCYSTOLA LEUCOSPORA, *n. sp.*

Male and female, 13-16 mm. Head, face, and thorax pale ochreous-grey. Palpi and antennæ greyish. Abdomen ochreous-whitish. Legs ochreous-whitish. Forewings moderate, costa gently arched, apex acute, hindmargin straight, or slightly sinuate; pale greyish, tinged with ochreous; an ill-defined fuscous line along costa; extreme costal edge pinkish-ochreous; an occasional ill-defined fuscous suffusion on inner margin at one-third; a fuscous dot in disc at one-third, sometimes obsolete, a second at two-thirds, and a third on fold obliquely below first; the latter two often accompanied by two white spots very variable in their development; a line of fuscous dots from costa at two-thirds, angulated in disc to anal angle, each fuscous dot accompanied by a white dot; a dark fuscous line around apex and along hindmargin; cilia pinkish-ochreous, at apex and anal angle fuscous. Hindwings grey, towards base ochreous-tinged; cilia grey.

Brisbane; from September to November; not uncommon. I have bred one specimen from *Acacia Cunninghami*.

MACHÆRITIS, *Meyr.*

M. calligenes, Meyr.; *M. melanospora*, Meyr.; *M. indocta*, Meyr. Brisbane.

LEPTOCROCA, *Meyr.*

L. sanguinolenta, Meyr. Brisbane.

Oecophora, *Z.*

O. hemisphærica, Meyr. Brisbane.

Meyrick also records *O. lagara*, Meyr., from Rosewood, and *O. eremæa*, Meyr., from Toowoomba.

Oecophora sphaeroides, *n. sp.*

Female, 14-15 mm. Head and face ochreous-whitish. Palpi ochreous-whitish; terminal joint and basal third of second joint fuscous. Antennæ ochreous-whitish annulated with fuscous. Thorax fuscous. Abdomen ochreous-fuscous. Legs ochreous-whitish; anterior pair fuscous. Forewings moderate, costa rather strongly arched, apex rounded, hindmargin obliquely rounded; ochreous-whitish; a fuscous spot at base of costa; a dark fuscous dot in disc at one-third, a second obliquely below first on fold, two confluent dots placed transversely in disc at two-thirds; a dark fuscous dot at anal angle; a fuscous shade in outer part of disc, sharply limited anteriorly by an outwardly oblique, outwardly curved line from costa beyond middle through posterior discal dots to before anal angle; posteriorly this shades off into ground colour; a submarginal line of confluent dark fuscous dots along posterior one-third of costa and hindmargin; cilia ochreous-whitish, at anal angle pale fuscous. Hindwings and cilia grey.

Brisbane; two specimens taken by Mr. Illidge.

Oecophora hemileuca, *n. sp.*

Female, 17 mm. Head and face snow-white. Palpi white; basal half of second joint fuscous. Antennæ dark fuscous. Thorax dark fuscous, with a large snow-white posterior spot. Abdomen ochreous-whitish. Legs ochreous-whitish. Forewings elongate, costa almost straight, apex tolerably acute, hindmargin very obliquely rounded; snow-white; a broad fuscous streak from base along costa to one-third; thence proceeds a fuscous fascia, slightly outwardly oblique, to inner margin before middle, its anterior edge sharply defined, posterior edge suffused; a darker dot on fold in posterior edge of this fascia; a broad fuscous fascia from costa near apex, narrowing abruptly to a point at anal angle; between the two fasciæ are some obscure fuscous markings in costal portion of disc; a fuscous spot on hindmargin below middle; cilia fuscous, just above anal angle ochreous-whitish. Hindwings grey, basal half whitish-ochreous; cilia, apical third fuscous, remainder whitish-ochreous.

Very distinct. In the absence of the male the generic position of this species cannot be exactly determined. In the specimen examined, which is rather worn, I cannot distinguish any trace of a pecten; further observation will be required to determine whether this is really absent. Brisbane; one specimen taken by Mr. Illidge.

Crossophora, *Meyr.*

C niphadia, Meyr. Brisbane.

Macrobathra, *Meyr.*

The following have been taken in the neighbourhood of Brisbane :—*M. chrysotoxa*, Meyr. ; *M. desmotona*, Meyr. ; *M. mesopora*, Meyr. ; *M. chlorosoma*, Meyr. ; *M. niphadobola*, Meyr. ; *M. argonota*, Meyr. ; *M. alternatella*, Walk. ; *M. xuthocoma*, Meyr. ; *M. crymalea*, Meyr. ; *M. melanargyra*, Meyr. ; *M. myriophthalma*, Meyr. ; *M. chrysospila*, Meyr. ; *M. diplochrysa*, Lower.

Meyrick also records *M. brontodes*, Meyr., from Rosewood, and *M. monostadia*, Meyr., and *M. nephelomorpha*, Meyr., from Toowoomba.

I have bred a specimen of *M. xuthocoma* from *Acacia penninerris* ; and a series of *M. chrysospila* from *Acacia complanata* and *A. decurrens*.

M. diplochrysa, Lower, I have bred abundantly from *Acacia Cunninghami* in September, but have never observed in the free state.

Macrobathra puncticulata, *n. sp.*

Male, 15 mm. Head and thorax dark fuscous. Face ochreous-whitish. Palpi ochreous-whitish ; second joint irrorated with fuscous ; terminal joint dark fuscous except at base and apex. Antennæ dark fuscous. Abdomen fuscous. Legs fuscous, annulated with ochreous-whitish. Forewings elongate-lanceolate ; dark fuscous ; an oblong, ochreous-white, outwardly oblique spot from costa at one-fourth, reaching fold ; an ochreous-white dot on middle of costa, a conspicuous white spot on costa at three-fourths ; a minute ochreous-white dot in centre of disc at one-third, a second on fold obliquely beyond first, a third in middle of disc, and a fourth in disc at two-thirds ; cilia fuscous. Hindwings and cilia grey.

Brisbane ; one specimen, bred from *Acacia sp.* in October.

Macrobathra chrysobaphes, *n. sp.*

Male and female, 13-16 mm. Head and face ochreous-yellow. Palpi ochreous-whitish ; second joint fuscous anteriorly ; terminal joint fuscous, except at base and apex. Thorax pale purple-fuscous, with a yellowish anterior and posterior spot. Abdomen fuscous, towards base ochreous-yellowish. Legs dark-fuscous, banded with whitish-yellowish. Forewings elongate-lanceolate ; pale purple-fuscous ; markings deep ochreous-yellow ; a small basal spot ; a broad outwardly oblique fascia from costa at one-fifth, not reaching inner-margin narrowest at costa, broad on fold ; a rather large spot on costa before middle, and another of

equal size on inner-margin opposite ; a small round spot on disc at two-thirds ; a rather large spot on costa at four-fifths, and a smaller spot on anal angle ; apical portion of disc darker fuscous ; cilia fuscous, beneath anal angle paler, on costal spot yellow. Hindwings and cilia grey.

Brisbane ; six specimens bred from *Acacia sp.* Closely allied to *M. chrysospila*, from which it is readily distinguished by the paler ground-color, deeper yellow markings, and especially by the broader fascia. I have bred a large number of the latter species, and find these points of distinction constant.

MACROBATHRA ROSEA, *n. sp.*

Male and female, 10-13 mm. Head dull rosy ; face paler rosy Palpi, second-joint rosy-whitish, irrorated with dark fuscous ; terminal joint dark fuscous, irrorated with rosy-whitish, apex whitish. Antennæ fuscous, obscurely annulated with whitish. Thorax dull rosy irrorated with dark fuscous. Abdomen fuscous. Legs fuscous ; anterior and middle pair banded with rosy-whitish ; posterior with whitish. Forewings elongate-lanceolate ; pale rosy ; base narrowly blackish-fuscous ; with four transverse blackish-fuscous fasciæ, more or less suffused and interrupted in disc ; first from costa at one-fifth to inner margin at one-fourth ; second from costa at two-flfths to middle of inner margin ; third from costa at three-fifths to before anal angle ; fourth from costa before apex to hindmargin just above anal angle ; cilia ochreous with a fuscous basal line, on costa and just above and below anal angle fuscous. Hindwings and cilia grey.

A pretty and very distinct species, Brisbane ; six specimens.

The following are new localities for the species mentioned. Ballandean (2500ft.) is seven miles north of Wallangarra on the Queensland border.

Eochrois laetiferana, Ballandean.
Zonopetala divisella, Ballandean.
Heliocausta severa, Ballandean.
Heliocausta limbata, Armidale (3500ft.), New South Wales.
Hoplitica pudica, Ballandean.
Hoplitica rufa, Ballandean.
Eulechria puellaris, Ballandean.
Eulechria epicausta, Ballandean.
Eulechria leucopelta, Ballandean.
Eulechria habrophanes, Ballandean.
Eulechria xylopterella, Armidale (3500ft.), New South Wales.
Sphyrelata indecorella, Ballandean.
Nephogenes apora, Ballandean.
Philobota arabella, Armidale.
Philobota anchylotoxa, Armidale.

Philobota chrysopotama, Armidale.
Philobota monoloncha, Armidale.
Philobota pruinosa, Armidale.
Philobota catachrysa, Armidale.
Philobota automina, Sydney, New South Wales.
Philobota occidua, Ballandean.
Philonympha leptostola, Ballandean.
Oxythecta alternatella, Armidale.
Oxythecta zonoteles, Armidale.
Oxythecta acceptella, Armidale.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 14, 1896.]

XIX.

BUPRESTIDÆ.

CALODEMA.

C. Wallacei, Deyr. There is an example of this insect in Mr. French's collection, which that gentleman informs me was taken in N. Queensland.

STIGMODERA.

S. magnifica, sp. nov. Sat lata; metallico-viridis, prothoracis disco elytrisque violaceo-purpureis, his fascia mediana communi sat lata aurantiaca ornatis; capite longitudinaliter concavo, antice grosse leviter (postice magis profunde minus grosse) punctulato; prothorace fortiter transverso, acervatim sat fortiter punctulato, antice valde angustato, lateribus mox ante basin fortiter dilatato-rotundatis; elytris fortiter striatis, striis leviter punctulatis, interstitiis convexis fere ut striæ punctulatis, lateribus postice crenulatis, apice breviter bispinoso. Long., 10 l.; lat., $4\frac{1}{5}$ l.

This magnificent insect is quite distinct by its color and markings from all others known to me. It should be placed I think near *S. alternozona*, Thoms.

N. Queensland; in the collection of Mr. French.

ELATERIDÆ.

TETRIGUS.

This genus is new to the Australian fauna. The antennæ are of very characteristic form in their lamellæ being given off from the *base* (not the apex) of the lamellated joint. The antennæ of the following species are exactly like those of *T. parallelus*, Cand. (as figured, Mon. Elat., vol. I., pl. v., fig. 5*a*), except in their apical joint being differently formed. The head too is very distinctive, the forehead being abruptly truncate in front, with the part which Dr. Candèze calls the "plaque nasale" abruptly perpendicular.

T. australicus, sp. nov. Elongatus; subparallelus; pubescens; capite prothoraceque crebre subtilius punctulatis; hoc quam

longiori parum latiori, angulis posticis retrorsum productis acutis carinatis; elytris prothoraci latitudine æqualibus, apice breviter submucronatis, subtiliter striatis, striis sat subtiliter minus crebre punctulatis, interstitiis planis crebre subtiliter punctulatis; antennarum articulo ultimo ad apicem breviter subappendiculato. Long., 16—18 l.; lat., 4—4½ l.

N. Queensland; sent to me by Mr. French.

TENEBRIONIDÆ.

SPILOSCAPHA.

S. thalloides, Pasc. This species (described by Mr. Pascoe as a *Platydema)* is certainly a *Spiloscapha*. Mr. Bates (E.M.M., IX., p. 203) has already expressed the opinion that the description of *P. thalloides* reads like that of *S. crassicornis*. Examples before me are certainly *P. thalloides*, equally certainly a *Spiloscapha*, and scarcely less certainly *S. crassicornis*, Bates,—which name consequently should be regarded as a synonym of Mr. Pascoe's name.

BRENTHIDÆ.

HORMOCERUS.

H. fossulatus, sp. nov. Griseo-brunneus, prothoracis sulco intus plus minusve flavescenti; opacus; rostro quam prothorax vix breviori, postice longitudinaliter sulcato; antennis quam rostrum multo brevioribus, robustis, articulis (basali apicalique exceptis) transversis; prothorace longitudinaliter profunde sulcato, ad latera grosse vix crebre punctulatis, antice angustato; elytris sulcatis, sulcis grosse punctulatis, interstitiis costulatis.

Maris rostro recto ad apicem dilatato; prothorace quam latiori duplo longiori; elytris ad apicem late explanatis; abdominis segmentis basalibus 2 late profunde concavis.

Feminæ rostro manifeste arcuato; prothorace quam latiori sesquilongiori; elytris ad apicem vix explanatis; abdominis segmentis basalibus 2 grosse vermiculatis, haud concavis. Long. (rostr. excepto), 8—10 l.; lat., $1\frac{3}{5}$—$1\frac{9}{10}$ l.

The genus *Hormocerus* has not, I believe, been previously recorded as Australian. The above species is clothed with a kind of dust-like squamosity which however is wanting on the front half of the rostrum and is very sparse on the disc of the prothorax. The antennæ are inserted (in the male scarcely, in the female distinctly) behind the middle of the rostrum.

N. Queensland; Cairns; sent to me by Mr. Froggatt and Mr. Masters.

MESETIA (gen. nov. *Brenthidarum*).

Mas. Caput fere ut *Ithysteni* sed paullo minus elongatum; rostrum leviter compressum quam prothorax paullo longius, supra longitudinaliter sulcatum ad apicem minus dilatatum; antennæ fere ut *Ithysteni* sed paullo breviores; prothorax et elytra fere ut *Ithysteni* sed his (speciei typicæ) sat fortiter striatis; femora postica vix ultra abdominis segmentum 2um extensa; tarsorum posticorum articulus 1us quam sequentes 2 conjuncti haud longior; abdominis segmenta basalia 2 longitudinaliter concava.

Femina latet.

In M. Lacordaire's arrangement of the *Brenthidæ* this genus is referable without hesitation to the division consisting of the two groups *Belorhynchides* and *Ithystenides* (which are distinguished *inter se* by the tarsi either "robust, with the basal joint not longer than the next two together" or "slender, with the basal joint longer") but it seems to be intermediate between those groups, having slender tarsi the basal joint of which does not exceed the next two in length. I cannot find that it has been hitherto characterised.

M. amæna, sp. nov. Rufo-testacea; capite antennis prothoracis vittis 3 pedibus elytrorum parte suturali et corporis subtus partibus lateralibus nigro-piceis, elytrorum vittis discoidalibus 3 angustis flavo-testaceis; capite prothoraceque fere lævibus; elytris leviter striatis, striis crebre minus fortiter punctulatis. Long. (rostro excepto), 8 l.; lat., $1\frac{1}{10}$ l.

N.S. Wales; Tweed River District; sent by Mr. Froggatt.

LONGICORNES.

OPSIDOTA.

O. æstuosa, sp. nov. Mas. Rufa, pilis albis sat sparsim vestita, his in prothoracis basi maculis 3 et in scutello condensatis; sat grosse (elytrorum apicem versus vix rugulose) rugulosopunctulata; antennis quam corpus vix longioribus, articulis (basalibus 2 exceptis) fortiter compressis, 3° quam 4us subbreviori, 11° appendiculato; prothorace quam longiori fere sesquilatiori, ante medium rotundato-dilatato, in disco longitudinaliter breviter elevato-glabro; elytrorum apice suturali spiniformi. Long., 15 l.; lat., $4\frac{2}{5}$ l.

Feminæ antennis quam corpus multo brevioribus, oculis quam maris inter se minus approximatis. Long., 18 l.; lat., 5 l.

Sculptured almost exactly as *Anatisis laminosus*, Newm., but a little more coarsely on the basal part of the elytra. Also bears considerable resemblance to *A. Frenchi*, Blackb., but at once distinguishable by its male having non-flabellate antennæ.

N. Queensland; sent to me by Mr. French.

ACROGENIUS (gen. nov. *Cerambycidarum*).

Caput antice productum; oculi emarginati, vix subtiliter granulati; antennæ (feminæ?) quam corpus sat breviores (articulis haud spinosis, 1° modico, 2° brevi, 3° quam 1us et quam 4us duplo longiori, 5° quam 4us vix breviori); prothorax subcylindricus inermis; elytra ad apicem truncata haud spinosa; coxæ intermediæ extus clausæ; femora petiolata, elongata, ad apicem subito valde clavata (posticis elytra paullo superantibus); tarsorum posticorum articulus 1us quam 2us 3us que conjuncti vix longior.

Its finely granulate eyes (about as finely as in *Ectosticta*, in which however the granulation is less fine than in many genera of the section) refer this genus to the second of M. Lacordaire's sections of the *Cerambycides*. In that section the combination of "intermediate coxæ closed externally," "front coxæ rather widely separated from each other," "head not narrowed behind," "elytra punctulate," "elytral epipleuræ obsolete," "eyes rather distant from each other" places this genus among six "groupes" which M. Lacordaire says cannot be distinguished *inter se* by any sharply defined character. Of these groups it appears to me that the *Tillomorphides* is the one in which the present genus is most at home. Its antennæ are not long enough for the *Rhopalophorides*, and other objections occur in respect of the remaining four. The most striking character seems to lie in its femora, all of which are petiolate and clavate in the most exaggerated degree, the petiole of the front femora being a little longer than (of the intermediate nearly twice as long as, and of the hind more than twice as long as) the clavate black apex. Thus the femora are not unlike those of *Ectosticta* except in being (especially the hind pair which are half again as long as the intermediate) much longer. The head, prothorax and antennæ are very much like those of *Acrocyrta chrysoderes*, Pasc., except in the yellow of the prothorax being of the derm (not caused by pubescence) and in the antennæ not being spinose.

A. tinctus, sp. nov. Sat elongatus; setis subtilibus erectis sat sparsim vestitus; capite meso- et meta- sternis pedibus (femorum petiolo excepto) prothoracis macula parva et elytris (notulis nonnullis exceptis) nigris, partibus ceteris rufo-testaceis, elytrorum notulis flavis exceptis [sc. in utroque elytro sutura et margine laterali usque ultra medium, plaga subscutellari elevata eburnea, notula lineari discoidali eburnea litteram 4 (sursum deorsum versatam) simulanti, inter hanc et marginem lateralem linea eburnea oblique posita, et fascia eburnea paullo ante apicem posita], antennis ad basin fere nigris ultra medium fuscescentibus;

capite fortiter (antice sat crebre postice sat sparsim) punctulato; prothorace subvelutino subopaco haud perspicue sculpturato, longitudine latitudini æquali, subcylindrico (sed lateribus leviter arcuatis); elytris crebre grosse rugulose (prope apicem minus crebre minus grosse) punctulatis. Long., 4 $\frac{1}{5}$ l.; lat., 1 $\frac{1}{5}$ l.

The elytral markings are not much like those of any other species known to me; the elevated ivory-like lines are of a *pale* yellow color and are placed on patches of brighter yellow than themselves and of similar shape. If the yellow color be taken as the ground, the blackish markings are *(a)* a large basal patch not quite touching the lateral margins and interrupted at the suture *(b)* a mark resembling the letter L (reversed on the left elytron); regarding the *yellow* color as the markings the *head* of the insect must be towards the observer to produce the effect of a yellow L, which is then seen on what appears to be the left elytron, that on the *right* elytron being then reversed *(c)* a patch covering the whole of about the apical quarter of the elytra.

N. Queensland; in the collection of Mr. French.

PHYTOPHAGA.

(Tribe) EUPODA.

CHEILOXENA.

C. insignis, sp. nov. Subelongata; minus opaca; fusca, antennis pedibusque rufescentibus, elytrorum tuberculis nigris; pilis brevibus albidis sat sparsim (his hic illic in elytris maculatim condensatis) vestita; prothorace sat transverso vix crebre punctulato, lateribus dentatis; elytris sat crebre vix seriatim tuberculatis; antennarum articulis 8°—10° brevibus submoniliformibus. Long., 4—4$\frac{1}{2}$ l.; lat., 1$\frac{4}{5}$—2 l.

Readily distinguishable from *C. Westwoodi*, Baly, *inter alia* by the short submoniliform joints 8—10 of its antennæ and the whitish hair-like scales of its surface which are condensed on the elytra to form rather conspicuous spots some of them considerably larger than any of the yellowish spots on the elytra of *Westwoodi*; also by the much more numerous and confusedly arranged tubercles of its elytra. Differs also from *C. Frenchæ*, Blackb., by the presence of lateral prothoracic teeth.

Victoria and N.S. Wales; on Eucalyptus.

(Tribe) GALERUCIDES.

In M. Lacordaire's classification this "tribe" forms the last section of the family *Phytophaga*. It is very numerously represented in Australia but up to the present time comparatively few of its Australian species have been described and named, and

those which have been named have not been treated of systematically or collectively. The following is an attempt at a systematic treatment of the tribe. I have no doubt that errors will be found in my work, and I do not think it possible to issue such a work as I am attempting without running the risk of error, as many of the existing descriptions are of such a nature that the identification of the species they refer to is most difficult, and even the apportionment of the species to *genera* is in some cases almost a matter of guess-work. M. Lacordaire divides the tribe into the "sub-tribes" *Halticides* and *Galerucides* according as the hind femora are or are not dilated giving the insects saltatorial faculties.

(Sub-Tribe) HALTICIDES.

Of this sub-tribe 78 species have been described and they are distributed among 19 genera. Two of these—*Haltica splendida*, Oliv., and *H. smaragdula*, Oliv.—are not intelligibly characterised and it is not possible to refer them to any *genus* with confidence. In Mr. Masters' Catalogue the former stands as a true *Haltica* (possibly correctly), the latter as an *Arsipoda*, but the description of the latter characterises the basal joint of its hind tarsi as "*valde elongatus*" which is inconsistent with a place in *Arsipoda*; I can offer no suggestion as to what it really is. It is quite possible that some of my generic determinations may not stand —*e.g.*, I think it probable that *Arsipoda* will be sub-divided eventually and I doubt the Australian *Crepidoderæ* remaining in permanent association with the European species of that genus. Under these circumstances it seems necessary to preface my work with a tabulated statement of generic characters which will enable the student to determine without hesitation to what genus I refer the inseets treated of in this memoir. I regret that I am unable to place the genus *Platycepha* in the tabulation; unfortunately however its author has not stated whether its antennæ are approximate at the base; if they are not approximate (but in that case surely the author, Dr. Baly, could not have overlooked the character) *Platycepha* must be extremely close to *Amphimela*; if they *are* approximate the genus seems to be near *Arsipoda* structurally (judged by Dr. Baly's diagnosis) but to differ *inter alia* by its hind tibiæ being strongly dentate. In the following pages I characterise three new genera and 56 new species of *Halticides*, besides recording as Australian four genera not previously attributed to Australia.

A. Front coxal cavities closed.
  B. Apical joint of hind tarsi not abnormally dilated.
    C. Claws bifid ... ... Podontia.
    CC. Claws appendiculate.
      D. Antennæ very widely separated at the base ... Amphimela.
      DD. Antennæ not abnormally separated at the base.

E. Mesosternum distinct.
F. Hind tibiæ distinctly sulcate.
G. Prothorax with an anterior sulcus on either side ... ... Nisotra.
*GG. Prothorax without anterior sulci.
H. Intermediate tibiæ not dentate externally.
I. Basal joint of hind tarsi longer than the two following together ... Xenidia
II. Basal joint of hind tarsi shorter than the two following together... Arsipoda
HH. Intermediate tibiæ dentate externally ... ... Plectroscelis.
FF. Hind tibiæ not or scarcely furrowed ... Crepidodera.
EE. Mesosternum concealed... ... ... Sphærophyma.
BB. Apical joint of hind tarsi strongly swollen ... Opisthopygme.
AA. Front coxal cavities open behind.
B. Claws simple ... ... Docema.
BB. Claws appendiculate.
C. Hind tibiæ unarmed ... ... Licyllus.
CC. Hind tibiæ mucronate.
D. Apical joint of hind tarsi not abnormally dilated.
E. Mucro of hind tibiæ normal.
F. Antennæ 11-jointed.
G. Mesosternum distinct.
H. Prothorax devoid of sulci.
I. Basal joint of hind tarsi not excessively elongated.
J. Hind tibiæ rounded or truncate at apex.
K. Species of large size (more than 2 l.) ... ... Sutrea.
KK. Very small species (about 1 l.) Phyllotreta.
JJ. Apex of hind tibiæ divided into two short lobes ... ... Aphthona.
II. Basal joint of hind tarsi half as long as its tibia ... ... Longitarsus.
HH. Prothorax with a transverse sulcus only.
I. Prothoracic sulcus bent hindward on either side to reach the base.
J. Mucro of front tibiæ normal ... Hyphaltica.
JJ. Mucro of front tibiæ very small placed above the tarsus ... Halticodes.
II. Prothoracic sulcus entirely transverse ... ... Haltica.
HHH. Prothorax with both transverse and longitudinal sulci.
I. All the tibia mucronate ... ... Xuthea.
II. Only the hind tibiæ mucronate ... Lactica.
GG. Mesosternum concealed ... ... Sphæroderma.
FF. Antennæ with only 10 joints ... ... Psylliodes.
FFF. Antennæ with only 9 joints ... ... Enneamera.
EE. Mucro of hind tibiæ bifid ... ... Dibolia.
DD. Apical joint of hind tarsi strongly swollen .. Œdionychis.

* I have attributed (with hesitation) to *Arsipoda* one species in which the basal sulci are interruptedly elongated nearly to the front margin.

AMPHIMELA.

A. australis, Blackb. I have received from Mr. Masters an example taken near Sydney which I hesitate to separate from this species although it differs markedly in coloring, its prothorax being entirely of a clear yellow color and its antennæ entirely pitchy-black. It is also of somewhat different form being a wider insect with its greatest width slightly behind the middle of the elytra; this difference of form may be sexual. Even as a variety it seems distinct enough to bear a name so I propose to call it "var. ? *piceicornis*."

XENIDIA.

The following species seem to be referable to this genus which has not previously been reported as Australian. Unfortunately it is not possible to be quite certain in identifying *Xenidia* without an authentic type as its author (Dr. Baly) does not say whether its front coxæ are closed behind. The following are the leading characters of the species described below: front coxæ closed behind; anterior four tibiæ unarmed (Dr. Baly gives no information regarding the front tibiæ); transverse sulcus of prothorax feeble or wanting; claws appendiculate; hind tibiæ very much as in *Plectroscelis* but with an even wider sulcus, and not furnished with a tooth externally; basal joint of hind tarsi longer than the following two together.

X. picticornis, sp. nov. Late ovalis; nitida; fortiter convexa; subtus picea; supra cupreo-purpurea, antennarum articulis 3° 4° 11° que plus minusve testaceis, pedibus plus minusve piceis vel rufo-piceis (femoribus posticis supra fere nigris purpureo-tinctis); capite lævi; oculis magnis; antennis quam corpus paullo brevioribus, sat gracilibus, apicem versus paullo incrassatis [articulo 1° modico, 2° quam 1ⁱ dimidium longiori, 3° quam 1ᵘˢ sublongiori, 4° quam 3ᵘˢ maris haud (feminæ paullo) breviori, 5° 3° longitudine æquali]; prothorace fortiter transverso, transversim leviter sulcato (sulco fortiter punctulato) et utrinque impresso, minus perspicue (sulco transverso excepto) punctulato, antice leviter angustato, lateribus sat fortiter marginatis leviter arcuatis paullo pone marginem anticum angulatis; elytris leviter (marginem versus fortius) striatis, striis fortiter punctulatis, interstitiis planis (marginem versus convexis) subtiliter punctulatis; tibiis posticis dilatatis fortiter sulcatis, sulci margine externo fortiter crenulato; tarsorum posticorum articulo basali ceteris conjunctis æquali. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

The coloring of this species,—especially the pallid (in some examples almost white) apical joint of its antennæ,—distinguishes it from its previously described congeners.

N. Queensland; taken by Mr. Koebele near Cairns.

X. bizonata, sp. nov. Sat late ovalis; sat nitida; sat fortiter convexa; obscure cyanea, antennarum parte intermedia elytrorum parte dimidia anteriori mesosterno metasternoque rufo-fulvis; capite fere ut præcedentis sed antennis paullo brevioribus, articulo 3° (♀ feminæ solum) quam 4us manifeste longiori; prothorace fere ut præcedentis sed sparsim sat fortiter punctulato; elytris (colore excepto) fere ut præcedentis sed paullo magis elongatis; pedibus fere ut præcedentis sed tibiarum posticarum sulci margine externo minus distincte crenulato. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

An easily recognisable species on account of its color and markings.

N. Queensland; taken by Mr. Koebele near Cairns.

X. melancholica, sp. nov. Late ovalis; nitida; fortiter convexa; nigra vix cyanescens, antennarum articulis 2—6 plus minusve testaceis, capite fere ut *X. picticornis* sed antennis manifeste brevioribus, articulo 3° (♀ feminæ solum) quam 4us manifeste longiori; prothorace utrinque ad basin vix impresso, transversim haud sulcato, cetera ut *X. picticornis*: elytris subtiliter seriatim punctulatis, nullo modo striatis, interstitiis subtilissime punctulatis; pedibus ut *X. picticornis*. Long., $1\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l. (vix).

N. Queensland; taken by Mr. Koebele near Cairns.

ARSIPODA.

There is great diversity of facies among the species that, according to Dr. Baly, ought to be attributed to this genus; but amid this diversity there seems to be great structural uniformity. I refer below (under *A. æneofulva*) to the sexual characters. The males, it may also be noted, have (I think in all the species) a fovea near the apex of the fifth ventral segment from which a furrow (varying from a deep sulcus to a fine line) runs hindward towards the base of the segment. In some few species the males have the hind femora strongly toothed. The following tabulated statement of characters includes those of the previously named species with the exception of *A. bifrons*, Er., which I am unable to place. I should have felt some hesitation in identifying *A. chrysis*, Oliv., had I not possessed an example ticketed as that species from the collection of Dr. Chapuis who probably had good reason for his identification.

A. Elytra dark or metallic.
  B. Seriate puncturation of elytra well defined—at any rate near the base.
    C. Prothorax with a transverse impression.
      D. Elytra dark, prothorax (at any rate partly) red.
        E. Anterior femora testaceous or red.

F. Head not impressed with deep foveæ.
G. Punctures in elytral series closely placed ... ... *laviceps*, Blackb.
GG. Punctures in elytral series much less closely placed ... ... *languida*, Blackb.
FF. Head impressed with deep foveæ... *Erichsoni*, Baly.
EE. Anterior femora black ... ... *bicolor*, Waterh.
DD. Elytra and prothorax uniformly dark or (if scarcely so) with metallic gloss.
E. Abdomen wholly dark, or at most apical segment partly reddish.
F. Size moderate or large.
G. Form more or less *elongate*-oval.
H. Antennæ (at most basal part excepted) piceous or black.
I. Hind angles of prothorax not acutely dentiform.
J. Elytra with a well-defined sub-basal transverse impression.
K. Elytral interstices somewhat strongly punctulate ... ... *chrysis*, Oliv.
KK. Elytral interstices scarcely visibly punctulate ... ... *jocosa*, Blackb.
JJ. Elytra evenly convex or nearly so ... ... *concolor*, Blackb.
II. Hind angles of prothorax acutely dentiform ... *cæruleata*, Baly.
HH. Antennæ entirely pallid ... *æneo-fulva*, Blackb.
GG. Form very short and broad ... *Lownei*, Baly.
FF. Size very small (long. 1 l.).
G. All the femora dark ... ... *consanguinea*, Blackb.
GG. The anterior femora fulvous ... *parvula*, Jac.
EE. Apical two or three segments of abdomen red in both sexes ... *Macleayi*, Baly.
CC. Prothorax devoid of transverse impression.
D. Elytra dark, prothorax red.
E. Abdomen black ... ... *fulvicollis*, Baly.
EE. Abdomen entirely rufous ... ... *spectabilis*, Blackb.
DD. Elytra and prothorax uniformly of dark color.
E. Form more or less *elongate*-oval.
F. Seriate punctures of elytra well defined at least in front half.
G. Femora at least as dark as the tibiæ.
H. Prothorax at most *moderately* narrowed anteriorly.
I. Apical portion of antennæ very strongly incrassate.
J. Abdomen unicolorous ... *piceipes*, Baly.
JJ. Apical portion of abdomen rufo-testaceous .. *crassicornis*, Waterh.
II. Apical portion of antennæ but little incrassate ... *consuta*, Germ.

HH. Prothorax twice as wide at base as at apex ... ... *striatipennis*, Blackb.
GG. Femora rufous, tibiæ blackish... *femorata*, Baly.
FF. Seriate punctures of elytra obsolete except close to the base ... *detersa*, Blackb.
EE. Form short and broad.
F. Elytra distinctly striate, legs fulvous *fulvipes*, Baly.
FF. Elytra not striate.
G. Legs fulvous ... ... *deceptrix*, Blackb.
GG. Femora black ... . *pallidicornis*, Blackb.
BB. Elytra without seriate puncturation (at least in front part of disc).
C. Prothorax without a transverse sulcus.
D. Prothorax and elytra concolorous or nearly so.
E. Form *elongate*-oval (general color black)
F. Elytra entirely black ... ... *holomelæna*, Germ.
FF. Elytra reddish in apical half ... *terminalis*, Blackb.
EE. Form short and broad (color green)... *nitida*, Waterh.
D. Elytra dark, prothorax red.
E. Elytra rugulose ... ... *rugulosa*, Baly.
EE. Elytra not rugulose ... ... *hæmatodera*, Baly.
CC. Prothorax with a transverse sulcus ... *paradoxa*, Blackb.
AA. Elytra non-metallic, more or less testaceous.
B. Size large (2½ l. or more) ... ... *podontioides*, Blackb.
BB. Size moderate or small (less than 2 l.).
C. Form *elongate*-oval.
D. Elytra with strongly defined seriate puncturation.
E. Punctures in the elytral rows closely placed ... ... *senescens*, Blackb.
EE. Punctures in the elytral rows very distantly placed ... ... *fossipennis*, Blackb.
DD. Elytra with scarcely traceable seriate puncturation.
E. Antennæ (except at base) dark piceous.
F. Prothorax closely punctulate ... *jugularis*, Blackb.
FF. Prothorax sparsely punctulate ... *hepatica*, Blackb.
EE. Antennæ testaceous ... ... *acuminata*, Waterh.
CC. Form broadly oval or subquadrate.
D. Seriate puncturation of elytra well defined.
E. Prothorax narrowed in front.
F. Elytral sculpture continuous almost to the apex.
G. Lateral margins of prothorax narrowed towards base.
H. Longitudinal furrow on each side of prothorax normal ... *variegata*, Waterh.
HH. Longitudinal furrow on each side of prothorax excessively wide ... ... *collaris*, Blackb.
GG. Lateral margins of prothorax not narrowed towards base ... *picturata*, Blackb.
FF. Elytral sculpture obsolete in apical one-third ... ... *variabilis*, Blackb.
EE. Prothorax fully as wide across front as across base ... ... *laticollis*, Blackb.
DD. Seriate puncturation of elytra obsolete *ovata*, Waterh.

A. læviceps, sp. nov. Mas. Ovalis; nitida; nigra, capite prothorace antennarum basi abdominis apice pedibusque rufis; capite lævi, inter oculos sulcato; antennis quam corporis dimidium paullo longioribus, sat robustis, articulo 1° incrassato minus elongato, 2° brevi, 3° quam 1us vix breviori, 4° 3° sat æquali; prothorace quam longiori duplo latiori, subcrebre minus fortiter punctulato, transversim et utrinque longitudinaliter profunde sulcato, lateribus vix arcuatis, angulis anticis incrassatis oblique truncatis; elytris leviter striatis (striis discoidalibus antice obsoletis), striis sat grosse sat crebre punctulatis, interstitiis punctulatis (postice et latera versus leviter convexis; femoribus posticis inermibus.

Feminæ pedibus posticis nigris, abdomine concolori. Long., $1\frac{4}{5}$—2 l.; lat., $\frac{9}{10}$ l.

Near *A. Erichsoni*, Baly, but differing *inter alia* in its red head, which is devoid of foveæ above the eyes.

Victoria and N.S. Wales; in mountainous places.

A. languida, sp. nov. Mas. Elongato-ovalis; nitida; subtus nigra, abdomine postice capiteque rufis; supra (antennis pedibusque inclusis, illis apicem versus piceo-tinctis) rufa, capite postice infuscato, elytris æneo-viridibus, nonnihil auratis; capite minus distincte punctulato, inter oculos sulcato; antennis quam corporis dimidium vix longioribus, minus robustis, articulis fere ut *A. lævicipitis* sed 1° paullo longiori minus incrassato; prothorace quam longiori minus quam duplo latiori, crebre subtilius punctulato, tranversim et utrinque longitudinaliter minus fortiter sulcato, antice angustato, lateribus vix arcuatis, angulis anticis incrassatis oblique late truncatis; ejytris vix striatis, seriatim minus fortiter minus crebre punctulatis, interstitiis planis punctulatis.

Feminæ antennis paullo brevioribus, pedibus posticis infuscatis, prothorace medio infuscato. Long., $1\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l.

Nearest to *A. bicolor*, Waterh. (probably) which is very insufficiently described, but as the femora of that species are said to be black I presume that this insect is not identical with it.

Victoria.

A. concolor, sp. nov. Mas. Ovalis, subelongata; nitida; obscure viridis, antennarum basi pedibusque vix picescentibus; capite inter oculos manifeste punctulato et transversim sulcato; antennis robustis quam corporis dimidium paullo longioribus, articulo 1° modico sat incrassato, 2° sat brevi, 3° quam 1us subbreviori quam 4us vix longiori; prothorace quam longiori duplo latiori sat quadrato, minus convexo, antice parum angustato, sat crebre sat distincte punctulato, transversim

(leviter) et utrinque longitudinaliter (sat profunde) sulcato, lateribus fere rectis, angulis anticis subtuberculiformibus; elytris æqualibus, vix striatis, seriatim concinne nec fortiter punctulatis, interstitiis planis minus subtiliter punctulatis.

Femina latet. Long., $2\frac{1}{5}$ l.; lat., 1 l.

A very distinct species, nearest perhaps to *chrysis*, Oliv., but differing *inter alia* in color, in its less convex and more quadrate prothorax and its evenly convex elytra.

Victoria.

A. jocosa, sp. nov. Mas. Ovalis, fere subparallela; nitida; nigra, capite prothoraceque læte viridibus, elytris cupreo-violaceis, antennarum articulis basalibus 4 (basali supra excepto) et tibiarum basi summa rufis; capite obsolete vix subtiliter punctulato, inter oculos minus distincte sulcato, a sulco antrorsum usque ad clypei apicem (longitudinaliter) præter modum anguste carinato; antennis ut *A. concoloris;* prothorace fere ut *A. concoloris* sed paullo magis obsolete punctulato, antice magis angustato; elytris paullo pone basin late leviter sat distincte transversim impressis, vix striatis, seriatim sat subtiliter nec crebre punctulatis, puncturis in parte antica discoidali multo magis sparsim dispositis, interstitiis planis pernitidis fere lævibus vel potius subtilissime punctulatis.

Femina latet. Long., $2\frac{2}{5}$ l.; lat., $1\frac{1}{5}$ l.

An extremely nitid and brilliantly colored species, remarkable for the narrowness and strong elevation of the convexity running forward between the antennæ from the transverse sulcus on the head.

Australia; I am not quite sure of the exact habitat, but it is almost certainly in Victoria.

A. æneofulva, sp. nov. Elongato-ovalis; nitida; obscure fulva, æneo-micans, antennis pedibusque sordide testaceis; capite crebre subtilius punctulato, inter oculos sulcato; antennis quam corporis dimidium paullo brevioribus apicem versus paullo incrassatis, articulo 1° modico, 2° minus brevi, 3° quam 1us sat breviori quam 4us paullo longiori; prothorace quam longiori duplo latiori, sat æqualiter cum capite punctulato, antice vix angustato, lateribus parum arcuatis, angulis anticis fortiter incrassatis oblique truncatis; elytris vix striatis, seriatim concinne sat subtiliter punctulatis, interstitiis planis subtiliter punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The color seems to be distinctive,—piceous (a little more pallid towards the apex) with a strongly marked bronzy gloss. This species somewhat resembles the preceding in sculpture but has the transverse sulcus of its prothorax much feebler. It is also a

considerably more elongate insect with shorter antennæ, different color, &c. The female does not differ from the male except in its slightly shorter antennæ, less dilated basal joint of tarsi, and differently formed apical segment of abdomen.

S. Australia; Eyre's Peninsula.

A. consanguinea, sp. nov. Sat elongata, postice sat angustata; nitida; supra viridis vel cyanea; subtus picea, antennis testaceis apicem versus vix vel manifeste infuscatis, femoribus rufo-piceis, tibiis tarsisque dilutioribus; antennis quam corporis dimidium sat brevioribus, articulis basalibus 2 incrassatis (hoc quam 3us haud longiori); capite cum prothorace subfortiter vix crebre punctulato, illo haud transversim carinato; prothorace sat transverso, antice angustato, ad basin utrinque longitudinaliter breviter sulcato, sulcis longitudinalibus sulco transverso conjunctis; elytris punctulato-striatis, puncturis in striis sat magnis, interstitiis apicem lateraque versus costiformibus. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

This species must be very near *A. parvula*, Jac., but differs from the description of that species in many respects; the legs are differently colored; there is no trace of any transverse ridge on its forehead; the interstices of the elytral striæ are not "costate throughout" but distinctly so only near the lateral margins and the apex. I have seen numerous examples of this insect, which do not vary *inter se* except in the upper surface of some of them being cyaneous rather than green and the antennæ being more or less infuscate near the apex.

N. Queensland; taken by Mr. Koebele and Mr. Cowley.

A. spectabilis, sp. nov. Fem. Ovalis, minus elongata; nitida; rufa, elytris obscure violaceis, antennis apicem versus et femorum posticorum apice piceo-nigris; capite minus distincte (inter oculos subfortiter sparsim) punctulato, inter oculos sulcato, juxta oculorum (his subapproximatis) partem postico-internam utrinque profunde excavato; antennis vix robustis quam corporis dimidium brevioribus, articulo 1° incrassato minus elongato, 2° minus brevi, 3° quam 1us vix breviori quam 4us sat longiori; prothorace quam longiori plus quam duplo latiori, subtilius minus crebre punctulato, antice sat angustato utrinque longitudinaliter sulcato, lateribus vix arcuatis, angulis anticis fortiter incrassatis oblique truncatis; elytris vix striatis, striis subtilius sat crebre punctulatis, interstitiis planis sparsim subtiliter punctulatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{4}$ l.

Mas. latet.

A notable species on account of the very wide and deep sulci

on the head at the postero-internal corner of the eyes (which in most *Arsipodæ* are much slighter impressions) and the comparatively narrow interval between the eyes.

Queensland; sent to me by Mr. Masters.

A. detersa, sp. nov. Mas. Ovalis; minus elongata; nitida; subtus cum antennis pedibusque nigra; supra obscure cyanescens vel violacea; capite inter oculos leviter sulcato, dupliciter (subtiliter et sat fortiter) nec crebre punctulato; antennis robustis quam corporis dimidium parum longioribus, apicem versus incrassatis; articulo 1° modico, 2° sat brevi, 3° quam 1us paullo breviori quam 4us vix longiori; prothorace quam longiori paullo plus quam duplo latiori, antice multo angustato, concinne subcrebre subtilius punctulato, utrinque longitudinaliter sulcato, lateribus leviter arcuatis, angulis anticis incrassatis antrorsum manifeste acutis; elytris vix striatis, seriatim punctulatis, seriebus mox pone basin obsoletis (externis fere ad medium continuis), interstitiis planis sat crebre minus subtiliter punctulatis. Long., $2\frac{1}{5}$—$2\frac{4}{5}$ l.; lat., $1\frac{1}{10}$—$1\frac{2}{5}$ l.

Femina differt ut *A. æneofulvæ*.

Var. ? colore æneo, statura minore.

Easily distinguishable by the sculpture of its elytra; well defined rows of punctures commence on the base but do not run further back than about one-fourth or one-third the length of the elytra where their punctures diminish to about the same size as those of the interstices. The var. ? is from N.S. Wales.

Victoria; Alpine region.

A. striatipennis, sp. nov. Fem. Ovalis vel fere obovata; fortiter convexa; minus nitida; fusco-picea, sat manifeste æneomicans, antennis pedibusque dilutioribus; capite subfortiter sat crebre punctulato, inter oculos fortiter sulcato; antennis modice robustis quam corporis dimidium manifeste brevioribus, articulo 1° sat elongato, 2° sat brevi, 3° quam 1us sat breviori quam 4us vix longiori; prothorace quam longiori plus quam duplo latiori, antice fortiter angustato sat crebre subfortiter punctulato, utrinque longitudinaliter sulcato, lateribus leviter arcuatis angulis anticis incrassatis oblique subtruncatis; elytris manifeste striatis, striis sat fortiter minus crebre punctulatis, interstitiis leviter convexis subtiliter punctulatis. Long., $2\frac{1}{5}$ l.; lat., $1\frac{1}{5}$ l.

Mas. latet.

A rather broad species, but much narrowed behind; it is notable by the seriate punctures of its elytra being placed in distinct striæ, the intervals between which are distinctly though only gently convex; the metallic gloss on the elytra is not

very marked so that it hovers a little doubtfully between the two groups (metallic and non-metallic species) into which I have divided the *Arsipodæ* in my tabulation.

S. Australia; Murray R. district.

A. deceptrix, sp. nov. Mas. Breviter ovalis; nitida; nigra, antennarum articulis basalibus 5 vel 6 pedibus abdomineque fulvis; capite sublævi, inter oculos sulcato, oculis inter se minus distantibus; antennis quam corporis dimidium paullo longioribus, articulo 1° modico minus crasso, 2° minus brevi, 3° quam 1us vix breviori quam 4us paullo longiori; prothorace quam longiori plus quam duplo latiori, sparsim minus subtiliter punctulato, antice leviter angustato, utrinque longitudinaliter sulcato, lateribus fere rectis, angulis anticis incrassatis oblique truncatis; elytris haud striatis, seriatim subtiliter (in parte discoidali quam prothorax nullo modo magis fortiter) punctulatis, interstitiis planis sparsim subtiliter (quam series magis subtiliter) punctulatis. Long., $1\frac{7}{10}$ l.; lat., 1 l. (vix).

Femina differt ut *A. æneofulvæ*.

This species must be very close to *A. fulvipes*, Baly (from N. Queensland), but can hardly be identical with it on account of its smaller size, and especially its non-striate elytra. (Dr. Baly says that the elytra of *A. fulvipes* are "distinctly punctate-striate.") The humeral calli being prominent cause the appearance of a furrow immediately within them, and these pseudo-furrows being opposite the longitudinal sulci of the prothorax it appears from a certain point of view as though the latter were continued on the elytra. A good idea of the sculpture of the elytra may be given by comparing it to that of the European *Apteropeda graminis*, Hoffm., which is similar in kind. In the present species, however, the seriate punctures are much coarser close to the base than on the rest of the surface, the largest punctures being larger than any on *A. graminis*, and the generality of punctures being decidedly finer than the seriate punctures of that species; the punctures of the interstices are a little finer than in *A. graminis*, so that (except close to the base) there is less difference between the seriate and interstitial punctures, from which it results that (except close to the base) the *rows* of punctures are considerably less conspicuous.

N.S. Wales; taken by Mr. Froggatt near Maitland.

A. pallidicornis, sp. nov. Fem. Late ovalis; nitida; nigra, antennis totis tibiis anterioribus 4 et tarsis omnibus pallide testaceis, abdomine rufo; capite ut *A. deceptricis*; antennis gracilibus, quam corporis dimidium vix longioribus, articulis 1—4 ut *A. deceptricis*; prothorace fere ut *A. deceptricis* sed

antice magis angustato angulis anticis antrorsum sat acutis, sulcis longitudinalibus obsoletis ; elytris fere ut *A. deceptricis* sed serierum puncturis basin versus quam alias haud majoribus, interstitiorum puncturis (quam *A. deceptricis*) majoribus sicut series subobsoletæ apparent.

Mas latet. Long., $2\frac{3}{5}$ l. ; lat., $1\frac{3}{5}$ l.

A fine large species resembling *A. Macleayi*, Baly, in form ; easily recognisable by the pale (almost whitish) testaceous color of its antennæ tarsi and anterior 4 tibiæ. Structurally it is very close to the preceding except in the slenderness of its antennæ.

Tropical Queensland ; taken by Mr. Koebele.

A. terminalis, sp. nov. Fem. Elongato-ovalis, postice acuminata ; nitida ; nigra, antennarum articulis 2°—4° pedibus (femorum posticorum apice nigro, tibiis paullo infuscatis) elytrorum dimidia parte apicali et abdominis apice rufo-testaceis ; capite tenuiter ruguloso, inter oculos sulcato ; antennis quam corporis dimidium brevioribus, sat robustis, articulis 5°—10° subserratis, articulo 1° sat brevi, 2°—4° inter se longitudine sat æqualibus quam 1us parum brevioribus ; prothorace quam longiori vix duplo latiori, dupliciter (subtilissime crebre et magis fortiter minus crebre) punctulatis, antice sat angustato, utrinque longitudinaliter breviter impresso, lateribus leviter arcuatis, angulis anticis antrorsum acutis ; elytris confuse minus distincte punctulatis, pernitidis ; tibiis posticis ante apicem leviter flexuosis. Long., $2\frac{3}{5}$ l. ; lat., $1\frac{1}{5}$ l.

Mas latet.

Very like *A. holomelæna*, Germ., from which it differs (apart from coloring) in its narrower and more elongate build, and in the hind tibiæ of the female being distinctly flexuous before the apex.

N.W. Australia.

A. paradoxa, sp. nov. Mas. Breviter ovalis ; sat nitida ; nigra vix ænescens, antennis pedibusque (femoribus plus minusve infuscatis exceptis) rufis ; capite postice sat lævi antice tenuiter ruguloso, inter oculos sulcato ; antennis robustis, quam corporis dimidium longioribus, articulo 1° modico, 2° minus brevi, 3° 2° longitudine sat æquali quam 4us sat longiori ; prothorace quam longiori duplo latiori, leviter sparsius punctulato, profunde transversim et utrinque longitudinaliter sulcato, antice parum angustato, lateribus leviter arcuatis, angulis anticis incrassatis oblique truncatis ; elytris confuse confertim subrugulose punctulatis ; femoribus posticis subtus dente magno armatis ; tibiis posticis fortiter arcuatis. Long., $1\frac{1}{5}$ l. ; lat., $\frac{3}{5}$ l.

Feminæ femoribus posticis muticis ; tibiis posticis rectis.

This is a very abnormal species which ought perhaps to be separated from *Arsipoda*. It differs from all its allies in the fourth joint of its antennæ being shorter than the second.

S. Australia; Eyre's Peninsula.

A. podontioides, sp. nov. Fem. Ovalis; nitida; testacea, elytrorum interstitiis (maculatim fere ut *Podontiæ nigrovariæ*, Macl.) striis epipleuris que femorum posticorum apice et tarsis subtus infuscatis; capite vix distincte punctulato, inter oculos interrupte sulcato; antennis corporis dimidio longitudine sat æquali, articulo 1° sat elongata, 2° brevi, 3° quam 1us sat breviori quam 4us vix breviori; prothorace quam longiori plus quam duplo latiori, antice vix angustato, subtiliter (ad latera acervatim sat grosse) punctulato, transversim et utrinque longitudinaliter fortiter sulcato, sulcis longitudinalibus antrorsum fere ad marginem anticum indistincte interrupte continuis, lateribus sat arcuatis, angulis anticis antrorsum acutis; elytris striatis, striis confertim subfortiter punctulatis, interstitiis leviter convexis vix manifeste punctulatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{2}{3}$ l.

Mas latet.

An abnormal species in appearance owing to the infuscate markings of its elytra which are much like those of *Podontia nigrovaria*, Macl.; indeed the insect has much resemblance to a very small *Podontia* but its appendiculate claws at once separate it from that genus. Its prothoracic sculpture is different from any of the varied types I have seen in other species of *Arsipoda*, but I do not find any marked structural character absolutely requiring a new generic name.

Queensland; sent to me by Mr. Masters.

A. ænescens, sp. nov. Mas. Elongato-ovalis; nitida; testacea vix ænescens, capite prothoraceque rufescentibus; capite distincte sat crebre punctulato, inter oculos sulcato; antennis modicis apicem versus incrassatis, articulo 1° sat elongato, 2° brevi, 3° minus elongato quam 4us paullo breviori; prothorace quam longiori minus quam duplo latiori, concinne sat crebre punctulato, transversim et utrinque longitudinaliter sulcato, antice leviter angustato, lateribus vix arcuatis, angulis anticis extrorsum acutis; elytris haud striatis, seriatim sat crebre minus fortiter punctulatis, interstitiis planis crebre distincte punctulatis.

Fem. latet. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

This species was sent to me by M. Sevrin from the Chapuis collection ticketed "*Arsipoda ænescens*, type." I cannot find that any description of it has been published; but, to provide against my being mistaken on this point, I have used the name *ænescens*,

although the æneous tone of coloring is so slight that I cannot regard the name as very appropriate.

W. Australia; Albany.

A. fossipennis, sp. nov. Fem. Elongato-ovalis; nitida; testacea; capite sparsim sat distincte punctulato, inter oculos sulcato; antennis quam corporis dimidium vix longioribus, articulo 1° minus elongato, 2° breviori, 3° quam 1us vix breviori 4° longitudine æquali; prothorace quam longiori minus quam duplo latiori, sat crebre minus subtiliter punctulato, antice paullo angustato, utrinque longitudinaliter fortiter et transversim subobsolete sulcato, lateribus leviter arcuatis, angulis anticis incrassatis oblique truncatis extrorsum acutis; elytris haud striatis, seriatim sparsim subgrosse punctulatis, interstitiis planis subtiliter minus crebre punctulatis. Long., $1\frac{2}{3}$ l.; lat., $\frac{3}{5}$ l.

This little species is notable for its uniform testaceous color and the coarse distantly placed punctures of its elytral series. I have a male example too much broken for description, but it does not seem to differ from the female except by the sexual characters common to the genus.

W. Australia; taken by Mr. Meyrick.

A. jugularis, sp. nov. Mas. Elongato-ovalis; nitida; testacea, capite postice subtus nigro, sternis et abdominis dimidio basali plus minusve infuscatis; antennis apicem versus nigricantibus, pedibus et abdominis apice rufescentibus; capite crebre subtiliter punctulato, inter oculos sulcato; antennis quam corporis dimidium brevioribus, robustis, apicem versus manifeste incrassatis, articulo 1° modice elongato, 2° brevi, 3° 4° que inter se sat æqualibus quam 1us sat brevioribus; prothorace quam longiori minus quam duplo latiori, crebre subtiliter punctulato, antice sat angustato, transversim et utrinque longitudinaliter leviter impresso, lateribus leviter arcuatis, angulis anticis vix incrassatis obtusis; elytris haud (postice vix manifeste) striatis, seriatim subtiliter crebre punctulatis, interstitiis planis crebre quam series parum magis subtiliter punctulatis (sicut series indistinctæ apparent); femoribus posticis dente parvo acuto armatis; tibiis posticis arcuatis.

Fem. latet. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The black middle of the hind portion of the head on the underside, the elytral series of punctures rendered inconspicuous by the comparatively strong puncturation of the interstices and the dentate hind femora of the male are notable characters of this species.

W. Australia; taken by Mr. Meyrick.

A. hepatica, sp. nov. Fem. Elongato-ovalis ; nitida ; livida, antennis apicem versus nigricantibus ; capite fere lævi, inter oculos sulcato ; antennis fere ut præcedentis sed articulo 2° quam 3us vix breviori ; prothorace fere ut præcedentis sed antice minus angustato, sparsim minus subtiliter punctulato, lateribus minus arcuatis, angulis anticis magis incrassatis oblique subtruncatis ; elytris haud striatis seriatim minus crebre minus subtiliter (suturam versus vix seriatim), interstitiis planis sparsim inæqualiter punctulatis (sicut series indistinctæ apparent).

Mas. latet. Long., $1\frac{2}{5}$ l.; lat., $\frac{7}{10}$ l. (vix).

The uniform nitid livid coloring of this species seems to be a marked character. The elytral puncturation is on the same plan as that of the preceding (*A. jugularis*), but the seriate punctures are less fine and much less closely placed, and the puncturation of the interstices is very uneven, being near the base and suture so strong as almost entirely to confuse the series and in other parts becoming finer so as to leave the series tolerably distinct.

S. Australia ; Eyre's Peninsula.

A. variegata, Waterh. An example in my collection from Tasmania (the locality of the type) agrees so well with Mr. Waterhouse's brief description of this species that there seems hardly any room for doubt about the correctness of its identification. Its small size, short robust form and variegated non-metallic elytra give it a facies so entirely different from (say) *A. chrysis* that one would not expect to find those two associated generically. Their structural characters however are very similar, and if Dr. Baly's view of *Arsipoda* be accepted,—that it is a genus in which several characters that in many genera are stable are subject to variation,—there seems to be no reason for excluding this species from *Arsipoda*. The following four species are all extremely closely allied to the insect referred to above, and with it form a very distinct group in the genus. I have specimens from the mountainous districts of Victoria and N.S. Wales which seem to me to be *A. variegata*.

A. collaris. sp. nov. Mas. Brevissime ovalis ; nitida ; rufescens, elytris (marginibus lateralibus exceptis) dilutioribus, abdomine obscuro, antennis apicem summum versus picescentibus ; capite coriaceo, inter oculos fovea sat magna impresso ; antennis quam corporis dimidium vix longioribus, articulo 1° minus elongato, 2° brevi, 3° 4° que inter se sat æqualibus quam 1us vix brevioribus ; prothorace quam longiori fere triplo latiori, antice distincte angustato, indistincte vix crebre punctulato, transversim et utrinque longitudinaliter profunde sulcato, sulcis longitudinalibus latissimis

fere transversis, lateribus subrectis; angulis anticis subincrassatis late oblique truncatis; elytris vix striatis, seriatim sat fortiter vix crebre punctulatis, interstitiis sat planis subtiliter punctulatis.

Femina differt ut *A. æneofulvæ*. Long., 1 l.; lat., $\frac{3}{5}$ l.

A species of shorter wider form than any of its immediate allies known to me; it is notable also for the great width of the excavation on either side the base of the prothorax and representing the longitudinal sulcus, which however is not strictly speaking longitudinal being a trifle wider than long.

S. Australia; Eyre's Peninsula.

A. picturata, sp. nov. Mas. Breviter ovalis; sat nitida; rufescens, supra dilutior, capite prothorace elytrisque concinne fusco- vel piceo-notatis, antennis ultra medium infuscatis; capite confertim subtilissime ruguloso, inter oculos transversim vix sulcato, macula elongata fusca ornato; antennis fere ut *A. collaris* sed articulo 1° magis elongato, 2° minus brevi; prothorace utrinque macula magna fusca discoidali ornato, quam longiori fere triplo latiori, antice leviter angustato, confertim subtilius subrugulose punctulato, transversim et utrinque longitudinaliter sulcato, sulcis longitudinalibus normalibus, lateribus minus arcuatis, æqualiter præter solitum late marginato, angulis anticis late subtruncatis; elytris maculis nonnullis piceis bene determinatis (sc. macula basali litteram C simulanti et macula post mediana transversa contorta) et maculis fuscis communibus nonnullis in sutura dispositis ornatis, fere ut *A. collaris* sculpturatis sed puncturis seriatis magis crebris interstitiis magis crebre magis distincte punctulatis. Long., $1\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.

Readily recognisable by the sharply defined markings of its upper surface and the prothoracic lateral margins distinctly wider than is usual in the genus, and of even width throughout their length.

S. Australia; sent to me by Mr. Masters.

A. variabilis, sp. nov. Mas. Breviter ovalis; sat nitida; colore varibilis, subtus obscura, supra rufa plus minusve infuscata vel picescens, elytris vel rufis piceo-umbratis vel fere totis piceis vel nigris, pedibus antennisque rufis (his apicem versus et illorum femoribus plus minusve infuscatis); capite coriaceo inter oculos vix distincte sulcato; prothorace fere ut *A. collaris* sed minus subtiliter punctulato, sulcis longitudinalibus multo minus latis; elytris haud striatis, seriatim minus fortiter minus crebre punctulatis, interstitiis planis quam *A. collaris* multo minus subtiliter punctulatis, sculptura in parte postica tertia subobsoleta. Long., $1\frac{3}{10}$ l; lat., $\frac{7}{10}$ l.

Femina differt ut *A. æneofulvæ*.

I have seen numerous examples of this species and scarcely two of them are quite similar to each other in color and markings of the elytra. The elytra of a light colored example are pale red with an ill defined dark common patch around the scutellum and another about the middle. In a series of examples these dark patches more or less increase in size and vary into black until in extreme specimens they coalesce and spread out to cover the whole elytra. The great enfeeblement of the sculpture on the apical third of the elytra is a conspicuous character.

Victoria; mountainous districts.

A. laticollis, sp. nov. Mas. Sat breviter ovalis; sat nitida; rufo-testacea, elytris (maculatim) et antennis (apicem summum versus plus minusve) infuscatis; capite coriaceo, inter oculos sulcato; antennis corporis dimidio longitudine vix æqualibus, articulis fere ut *A. collaris;* prothorace quam longiori plus quam duplo latiori, antice haud angustato, sat crebre sat fortiter punctulato, transversim et utrinque longitudinaliter profunde sulcato, sulcis longitudinalibus normalibus, lateribus vix arcuatis, angulis anticis subtruncatis paullo pone marginem anticum extrorsum distincte acutis; elytris ut *A. collaris* sculpturatis; tibiis posticis extus ante apicem late distincte angulatis. Long., 1—1½ l.; lat., ⅗—⅘ l.

Feminæ tibiis posticis haud angulatis.

Near *A. collaris* but differing *inter alia* in color and markings, in the prothorax not narrowed in front and with longitudinal sulci less wide and in the evident external angulation of the male hind tibiæ. The infuscate blotches on the elytra are ill-defined and variable; they usually consist of an elongate discoidal blotch near the base and a larger one somewhat behind the middle.

S. Australia; near Quorn.

PLECTROSCELIS.

The task of dealing with the Australian species of this genus presents exteme difficulty owing to the fact that a number of species (12) have been described by Dr. Baly in such fashion that it is impossible to identify them with any confidence from the descriptions; for though the descriptions are fairly detailed, scarcely any are more than bare descriptions, and the absence of comparison with other species causes the utmost difficulty in forming any clear idea of the insects they relate to. I have associated many of Dr. Baly's names with insects in my collection, but with so much doubt that I cannot venture on making confident use of my identifications for the purposes of this memoir. Hence I am obliged also to pass unnoticed some species in my

collection which are probably undescribed but may be among Dr. Baly's, and to limit myself to describing new species that seem *very decidedly* different from those already characterised. As Dr. Baly's species are scattered through 3 separate memoirs without any connected classification it will be convenient for me to include in this memoir some brief notes on their probable relation to the species I describe below. I annex a tabular statement of the characters of the new species I now describe, and have been able to work into that statement by studying Dr. Baly's descriptions the characters of four of his species with tolerable confidence ; of the remaining eight I have discussed *P. Wilsoni* below (under *P. propinqua)* and *P. fuscomaculata* (under *P. tumbyensis).* There still remain six on which I make the following notes :— *P. australica* is probably near *P. propinqua calida* and *longior*, but cannot be placed in my tabulation as the information is wanting whether its elytral interstices are costiform towards the apex. It seems to differ *inter alia* from *propinqua* by its prothorax having no basal impressions, from *calida* by its prothorax being rugulose laterally, and from *longior* by there being a row of large punctures on its elytra between the suture and the abbreviated stria. *P. carinata* I cannot place among my species, but it seems to be a very distinct species by the presence of a longitudinal linear carina on its clypeus. *P. Erichsoni* must be near *varipes*, differing *inter alia* by its elytral interstices subcostate near the apex. Concerning *P. laticeps* I cannot form any clear idea. *P. megalopoides* is probably near *calida*, differing *inter alia* by the front angles of its prothorax acutely directed outward. *P. submetallescens* is no doubt near *longior*, but differs by its elytral stria being "sulcate," whereas in *longior* the stria are quite lightly impressed.

It should be noted that, as far as my observations go, there are sexual differences in some at least of the Australian species of this genus in the antennæ being longer and the head and prothorax a little less closely and strongly punctured in the males than the females, so that slight differences in these characters cannot be relied on as specific.

A. Species not exceptionally parallel in form.
  B. Interval between the eyes much greater than the width of an eye.
    C. Prothorax strongly punctured.
      D. Metallic species.
        E. The abbreviated subsutural stria of the elytra quite traceable.
          F. Front femora (at least partly) concolorous with their tibiæ.
            G. Elytral interstices wide and but little convex behind.
              H. Prothorax considerably less than twice as wide as long.

I. Size moderate — more than 1 l. long... ... ... *calida*, Blackb.
II. Size very small, at most scarcely 1 l. long... ... *noxia*, Blackb.
HH. Prothorax very fully twice as wide as long ... ... *propinqua*, Baly.
GG. Elytral interstices narrow and costiform behind ... ... *longior*, Blackb.
FF. Front femora black (or nearly so) in strong contrast with their tibiæ.
G. Punctuation of prothorax very strong ... ... *varipes*, Blackb.
GG. Punctuation of prothorax much less strong (almost fine) ... *minutalis*, Blackb.
EE. Subsutural stria or row of punctures quite lost in confused puncturation.
F. Punctuation of prothorax very strong and close ... .. *crebra*, Blackb.
FF. Punctuation of prothorax much less strong and close ... ... *Olliffi*, Blackb.
DD. Fulvous, non-metallic species.
E. Punctuation of head close, continuous with that of prothorax ... ... *tumbyensis*, Blackb.
EE. Punctuation of head sparse, much less close than that of prothorax *hypocrita*, Blackb.
CC. Prothorax extremely finely punctured.
D. Prothorax without longitudinal basal grooves.
E. Punctures in the elytral striæ coarse
F. Antennæ reaching considerably beyond base of prothorax ... *aciculata*, Blackb.
FF. Antennæ not reaching beyond base of prothorax ... ... *Albertisi*, Jacoby.
EE. Punctures in the elytral striæ fine... *brevicornis*, Baly.
DD. Prothorax with a longitudinal basal groove on either side ... ... *laticollis*, Baly.
BB. Interval between the eyes equal or nearly so to the width of an eye.
C. Elytral interstices costiform and narrow near apex ... ... *impressipennis*, Blackb.
CC. Elytral interstices not (or scarcely) convex behind ... ... *eyrensis*, Blackb.
AA. Form elongate, parallel.
B. Head subopaque, and with large feebly impressed punctures.
C. Punctures of elytral striæ coarse (much larger than those of the prothorax) ... *crassipennis*, Blackb.
CC. Punctures of elytral striæ much finer (about equal to those of the prothorax) *quadraticollis*, Blackb.
BB. Head closely and evenly punctured.
C. Discal interstices of elytra quite flat ... *pallidior*, Blackb.
CC. Discal interstices of elytra more or less convex.
D. Interstices of elytra not granulose ... *Meyricki*, Blackb.
DD. Interstices of elytra granulose ... *Waterhousei*, Baly.

P. calida, sp. nov. Ovalis; convexa; nitida; ænea, viridi-vel auro-micans, antennis rufis apicem versus infuscatis, pedibus rufis (femoribus posticis aneis); capite sat lato, subfortiter plus minusve crebre punctulato, oculis inter se distantibus, sulcis interocularibus sat distinctis; antennis quam corporis dimidium (maris sat manifeste, feminæ vix) longioribus, articulo 1° quam 2us 3us que conjuncti (hoc quam ille manifeste longiori) sat breviori; prothorace quam longiori manifeste minus quam duplo latiori, maris minus fortiter minus crebre (feminæ sat fortiter sat crebre) punctulato, antice sat angustato, lateribus leviter arcuatis, angulis anticis antrorsum acutis; elytris striatis, striis sat fortiter minus crebre punctulatis, interstitiis haud punctulatis leviter convexis postice haud costiformibus. Long., $1\frac{1}{5}$—$1\frac{2}{5}$ l.; lat., $\frac{3}{5}$—$\frac{7}{10}$ l.

Of this species, of which I have numerous examples apparently taken in company, some specimens are a little smaller than the majority with longer antennæ and their head and prothorax less closely and strongly punctured; I take them to be the males. The subsutural abbreviated stria is punctured a little confusedly but is quite well defined.

N. Queensland; taken by Mr. Koebele.

P. longior, sp. nov. Elongato-ovalis; sat convexa; sat nitida ænea, antennis rufo-testaceis plus minusve piceo-tinctis, pedibus rufo-testaceis femoribus plus minusve infuscatis exceptis; capite lato, sat fortiter minus crebre punctulato, oculis inter se valde distantibus, sulcis interocularibus distinctis; antennis quam corporis dimidium sat longioribus, articulo 1° quam 2us 3us que conjuncti (his inter se longitudine sat æqualibus) vix breviori; prothorace quam longiori duplo latiori, fortiter crebre punctulato, antice vix angustato, lateribus fere rectis, angulis anticis extrorsum manifeste acutis; elytris leviter striatis, striis sat fortiter sat crebre punctulatis, interstitiis subtiliter punctulatis convexis postice angustis subcariniformibus. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

Each joint of the antennæ after about the 3rd is more or less stained with piceous; the front part of the femora is more or less widely infuscate (in some examples only very narrowly).

S. Australia; near Port Lincoln.

P. noxia, sp. nov. Ovalis; sat elongata; sat convexa; subnitida; obscure æneo-viridis, nonnullorum exemplorum pedibus anterioribus et tibiis tarsisque posticis plus minusve dilutioribus, antennarum basi testacea; capite sat lato, coriaceo et puncturis nonnullis distinctis im-

presso, inter oculos (his inter se distantibus) transversim impresso, inter antennas longitudinaliter convexo; antennis corporis dimidio longitudine sat æqualibus, articulo 1° sat elongato, 2° paullo breviori, 3° quam 2us subbreviori; prothorace quam longiori minus quam duplo latiori, confertim subtiliter punctulato, antice angustato, lateribus leviter arcuatis, angulis anticis extrorsum nullo modo directis; elytris vix striatis, striis vix crebre minus fortiter punctulatis, interstitiis sat planis subtiliter punctulatis; tibiis posticis apice valde mucronatis. Long., 1 l. (vix); lat., ½ l.

This species must resemble *P. submetallescens*, Baly, in size and color but it differs from the description of that insect by the front angles of its prothorax being not in the least directed outward and the interstices of its elytra not being costate at the sides and apex. It is said to be destructive to vegetation.

N.S. Wales; near Wentworth; taken by Miss Cudmore.

P. propinqua, Baly. A species occurring somewhat plentifully near Adelaide is, I have little doubt, this insect. I expect that *P. Wilsoni*, Baly, is a mere variety. Unfortunately Dr. Baly has made no comparison between the two species and has used so nearly the same words in describing them that after a careful examination of the two descriptions the only clearly specified differences I can discover consist in *Wilsoni* being a trifle smaller than *propinqua*, having somewhat darker femora, the unpunctured part of the head less rugulose and the lateral punctures one or two less in number. It alse seems to be implied that the small basal impressions on the prothorax of *propinqua* are wanting in *Wilsoni* and nothing is said about its front prothoracic angles being produced externally. I have examples (which I cannot separate specifically from those that agree perfectly with the description of *propinqua*) in which some of these trifling differences are apparent. *P. propinqua* appears to me to be a variable insect widely distributed in Southern Australia distinguishable from its congeners most readily by the sculpture of its head; the middle part is finely strigose or finely rugulose and almost impunctate, but there are a few large coarse punctures on each side near the hindmargin of the eyes. In typical specimens of *propinqua* the front part of the middle space on the head is very distinctly rugulose and the basal impressions of the prothorax are quite distinctly traceable; while the legs are entirely of a dull fulvous color, except the hind femora. I have this form only from the Adelaide district. From Yorke's Peninsula I have two examples which may be *Wilsoni* although their legs are not as darkly colored as those of the type of *Wilsoni* seem to have been. I have a number of specimens from the Port Lincoln dis-

trict which present slight uniform distinctive characters perhaps entitling them to be considered a local variety and which may be thus characterised :

Var. *lindensis*. Minor (long. 1 l.). Differt capitis parte mediana strigosa nec rugulosa ; prothorace ad basin vix manifeste impresso

(This variety differs from *Wilsoni* by its smaller size and fulvous legs, except the hind femora).

I have also some specimens from the higher mountains of Victoria which seem to represent a local race though hardly deserving to be considered a species ; they may be thus characterised :

Var. *alpicola*. Major (long., $1\frac{1}{2}$ l.). Differt capitis parte mediana subcoriacea, vix strigosa (subtilissime nec rugulose punctulata), puncturis magnis prope oculos sat numerosis ; prothoracis impressionibus basalibus sat distinctis.

(This variety differs from *Wilsoni* by its larger size, and legs, except the hind femora, entirely fulvous).

I may add that I find the angularity of the front corner of the prothorax a character that cannot be relied upon. In all the above mentioned specimens the front angles are more or less produced externally ; I have even specimens in which one angle seems more prominent than the other ; in the specimens from Port Lincoln and Yorke's Peninsula the angle seems less marked than in those from the Adelaide district and Victoria, in some examples it is scarcely traceable.

P. varipes, sp. nov. Ovalis, sat elongata ; nitida ; ænea, tibiis tarsisque rufis piceo-variegatis, antennis rufis (parte dimidia apicali infuscatis) ; capite convexo leviter crebre vix subtiliter punctulato, sulcis interocularibus sat profundis (ab oculorum parte postica ad antennarum basin fere recte ut lineæ sat subtiles extensis) ; antennis quam corporis dimidium haud longioribus, articulo 1° quam 2us 3us que conjuncti haud breviori, his inter se sat æqualibus ; prothorace quam longiori minus quam duplo latiori, sat grosse sat crebre punctulato, quam caput distincte latiori, antice distincte angustato, lateribus vix arcuatis, angulis anticis paullo incrassatis sat acutis sed vix extrorsum directis ; elytris striatis, striis sat grosse nec confertim punctulatis (striæ primæ puncturis vix confusis), interstitiis manifeste punctulatis vix convexis. Long., $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

Near *P. Olliffi*, Blackb., but of a less brightly brassy tone of color, with all the femora dark, the prothorax and elytral striæ considerably more strongly punctulate, and the interstices of the elytral striæ less flat.

N.S. Wales ; Blue Mountains.

P. minutalis, sp. nov. Ovalis, modice elongata; nitida; ut præcedens colorata; capite fere ut præcedentis sed sparsim subtiliter punctulato; antennis quam corporis dimidium sat brevioribus, apicem versus incrassatis, articulo 1° quam 2us 3us que conjuncti breviori, 2° brevi (quam 3us sat breviori); prothorace fere ut præcedentis sed multo minus fortiter punctulato; elytris fere ut præcedentis sed striarum puncturis manifeste minoribus. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

This very small species is much like the preceding *(P. varipes)* in miniature but differs from it in its antennæ being much shorter with differently proportioned joints and in its very much more finely punctulate head and prothorax. In tabulating the species of the genus I have placed this one among those with the prothorax strongly punctulate, but with some hesitation; the puncturation of its prothorax however is much less fine than in the species in which I have called the prothoracic puncturation fine.

Victoria.

P. Olliffi, Blackb. When I described this species I omitted to mention a character which though slight seems (from the examination of a considerable series of allied species) to be of some importance, viz., the presence on the portion of the elytra between the suture and the first complete stria of very coarse interstitial puncturation among which the shortened subsutural row of punctures is entirely untraceable.

P. crebra, sp. nov. Sat breviter ovalis; minus convexa; sat nitida; viridi-ænea, elytris plus minusve violaceo-micantibus, pedibus (femoribus posticis plus minusve infuscatis vel nigris vel violaceis exceptis) rufis, antennis obscuris basi dilutioribus; capite sat lato, crebre minus fortiter punctulato, oculis inter se distantibus, sulcis interocularibus leviter impressis; antennis quam corporis dimidium brevioribus, articulo 1° quam 2us 3us que conjuncti breviori, hoc quam ille vix longiori sed multo graciliori; prothorace quam longiori vix duplo latiori, subgrosse sat crebre punctulato, antice leviter angustato, lateribus leviter arcuatis, angulis anticis haud extrorsum acutis; elytris fortiter punctulato-striatis, interstitiis leviter convexis lævibus (1° excepto, hoc tam fortiter punctulato ut striæ primæ puncturæ sunt penitus confusæ). Long., 1 l.; lat., $\frac{3}{5}$ l. (vix).

A short broad species notable for the very coarse puncturation of its prothorax and the absence of a defined abbreviated subsutural stria, the space between the suture and the first complete stria being occupied with confused coarse puncturation devoid of linear arrangement.

N. Queensland; taken by Mr. Koebele.

P. tumbyensis (var. ? *P. fuscomaculata*, Baly). Elongato-ovalis; sat convexa; sat nitida; testacea, capite prothorace scutello elytrorumque maculis nonnullis infuscatis et æneo-micantibus, antennarum articulis (3 vel 4 exceptis) plus minusve piceo-tinctis; capite fortiter plus minusve crebre haud (vel parum) rugulose punctulato, sat lato, oculis inter se valde distantibus, sulcis interocularibus sat profundis; antennis quam corporis dimidium vix longioribus, articulo 1° quam 2us 3us que conjuncti (hoc quam ille sat longiori) parum breviori; prothorace quam longiori duplo latiori, crebre subgrosse punctulato, antice parum angustato, lateribus rectis, angulis anticis manifeste extrorsum acutis; elytris fortiter punctulato-striatis, interstitiis punctulatis convexis postice angustis costiformibus. Long., $1\frac{1}{3}$ l.; lat., $\frac{1}{2}$ l.

The markings on the elytra are of a reddish fuscous color with a slight brassy tone; they consist of a subbasal fascia not reaching the lateral margins, a median fascia much narrowed about the suture, and a very faint subapical fascia; in some samples they are almost obsolete. It is possible that this is a local form of *P. fusco-maculata*, Baly, but I think it more probably a distinct species as it differs from the description not only in the markings of the elytra and the absence of infuscation on the under surface, but in several more important characters—notably in the straight sides of its prothorax. I have seen about half-a-dozen specimens which differ *inter se* only in the sculpture of the head (a sexual variation I believe) and the greater or less distinctness of the markings on the elytra.

S. Australia; Eyre's Peninsula, near Tumby.

P. hypocrita, sp. nov. Ovalis, sat elongata; sat convexa; sat nitida; testacea, capite prothoraceque rufescentibus, antennis apicem versus et femoribus posticis infuscatis; capite lato, sparsim grosse punctulato; oculis inter se valde distantibus, sulcis interocularibus minus profundis; antennis quam corporis dimidium subbrevioribus, minus robustis, articulo 1° quam 2us 3us que conjuncti vix breviori, 2° quam 3us multo crassiori et sublongiori; prothorace quam longiori vix duplo latiori, fortiter sat crebre punctulato, antice parum angustato, lateribus fere rectis, angulis anticis manifeste extrorsum acutis; elytris modice striatis, striis confertim minus fortiter punctulatis, interstitiis vix convexis vix manifeste punctulatis. Long., 1 l.; lat., $\frac{2}{3}$ l.

Notable for the pale testaceous color of its elytra and the coarse sparse puncturation of its head.

W. Australia.

P. aciculata, sp. nov. Ovalis; convexa; nitida; ænea, antennis

(parte dimidia apicali nigra excepta) pedibusque (femoribus posticis æneis exceptis) rufo-fulvis; capite sat lato, subtiliter ruguloso et puncturis nonnullis sparsim impresso, oculis inter se distantibus, sulcis interocularibus fortiter impressis; antennis quam corporis dimidium subbrevioribus sat robustis, articulo 1° quam 2us 3us que conjuncti (his inter se sat æqualibus) paullo breviori; prothorace quam longiori minus quam duplo latiori, subtilissime strigoso et sparsius subtiliter (ad latera paullo magis fortiter) punctulato, antice (superne viso) sat angustato, lateribus leviter arcuatis, angulis anticis vix incrassatis nec extrorsum directis; elytris leviter striatis, striis sat grosse minus confertim punctulatis, interstitiis sat planis (latera apicemque versus leviter convexis) minus perspicue punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is notable among its Australian congeners for the very fine punctures (resembling pricks with the point of a fine needle) sparsely distributed over the disc of its prothorax.

Victoria; on the higher mountains.

P. impressipennis, sp. nov. Ovalis; sat elongata; modice convexa; nitida; fulva, vix cupreo-micans, antennis apicem versus paullo (vel vix) infuscatis, pedibus rufo-testaceis; capite minus lato, coriaceo vel subtiliter ruguloso, oculis magnis inter se subapproximatis, sulcis interocularibus fortiter impressis ad oculos contiguis; antennis quam corporis dimidium longioribus, articulo 1° quam 2us 3us que conjuncti (his inter se sat æqualibus) parum breviori; prothorace quam longiori fere triplo latiori, crebre fortiter punctulato, quadrato, quam caput multo latiori, antice haud angustato, mox intra marginem lateralem (hoc fere recto) longitudinaliter manifeste impresso, angulis anticis incrassatis plus minusve distincte extrorsum prominulis, basi utrinque fovea brevi obliqua impressa; elytris paullo pone basin manifeste transversim-arcuatim late impressis; fortiter punctulato-striatis, interstitiis subtiliter punctulatis convexis (latera apicemque versus sat fortiter costiformibus). Long., $1\frac{2}{5}$ l.; lat., $\frac{7}{10}$ l.

A very distinct species on account of its comparatively large size, its large subapproximate eyes, the well defined longitudinal impressions (almost sulci) just within the lateral borders of its prothorax, and the well defined wide shallow impression from shoulder to shoulder on its elytra. Owing to the interocular sulci on its head being very close to its eyes, the spaces on the head which Mr. Baly calls the "interocular spaces" are extremely narrow. I have two examples (from S. Australia) somewhat smaller than typical specimens, a little wider and less elongate,

with the front angles of their prothorax rather more strongly directed outward which may possibly represent a distinct species.

S. Australia.

P. eyrensis, sp. nov. Præcedenti (*P. impressipenni*) affinis; differt elytris multo minus fortiter striatis, striis multo minus crebre punctulatis, interstitiis planis (latera apicemque versus vix convexis). Long., $1\frac{3}{10}$ l.; lat., $\frac{2}{5}$ l.

Remarkably like the preceding but with very differently sculptured elytra. In *impressipennis* these have deep striæ with crowded punctures giving them a catenulated appearance, while in the present species the striæ are slight so that the sculpture is not very much more than rows of punctures on the surface, the several punctures in the rows being well isolated from their fellows. The very slight convexity of the interstices even near the apex and lateral margins further distinguishes this insect from the preceding.

S. Australia; near Lake Eyre.

P. quadraticollis, sp. nov. Elongata; subparallela; minus convexa; sat nitida; æneo-picea, antennis pedibusque fulvescentibus, illis apicem versus piceo-tinctis; capite lato, subtiliter strigoso et puncturis sat magnis leviter minus crebre impresso, sulcis interocularibus obsoletis, oculis inter se valde distantibus; antennis gracilibus quam corporis dimidium sat longioribus, articulo 1° quam 2us 3us que conjuncti (his inter se sat æqualibus) vix breviori; prothorace quam longiori plus quam duplo latiori, crebre fortiter punctulato, quadrato, quam caput vix latiori, margine antico quam posticus latiori, lateribus fere rectis, angulis anticis incrassatis sed vix extrorsum directis; elytris leviter striatis, striis crebre minus fortiter punctulatis (striæ primæ puncturis sat confusis), interstitiis vix (apicem versus nullo modo) convexis vix manifeste punctulatis. Long., 1 l; lat., $\frac{2}{5}$ l.

Seems to be allied to *P. Waterhousei*, Baly and *laticeps*, Baly (both from W. Australia) and to differ from them *inter alia* by the peculiar sculpture of its head, also by its prothorax being at at its widest across the front.

S. Australia; Quorn, &c.

P. pallidior, sp. nov. Præcedenti valde affinis; differt statura majore, colore toto (antennis apicem versus infuscatis exceptis) brunneo-testaceo, capite haud strigoso crebre sat æqualiter punctulato, prothorace paullo minus fortiter minus crebre punctulato, elytrorum interstitiis subtiliter distincte punctulatis omnibus (extermis 2 vix convexis exceptis) planis. Long., $1\frac{1}{4}$ l.; lat., $\frac{1}{2}$ l.

S. Australia.

P. crassipennis, sp. nov. Ovalis, sat elongata; sat nitida; subtus obscure rufescens, supra brunneo-testacea, (capite prothoraceque plus minusve rufescentibus), antennis testaceis (parte dimidia apicali plus minusve picescenti), pedibus testaceis (femoribus posticis plus minsuve infuscatis) nonnullorum exemplorum sutura infuscata; capite fere ut *P. quadraticollis* sed sulcis interocularibus minus obsoletis (ab oculorum parte postica ad antennarum basin ut lineæ subtiles rectæ extensis) antennis fere ut *P. quadraticollis* sed subbrevioribus paullo robustioribus; prothorace quam longiori duplo latiori, subgrosse vix crebre punctulato, quam caput paullo latiori, antice distincte angustato, lateribus leviter arcuatis, angulis anticis parum incrassatis sat acutis sed haud extrorsum directis; elytris striatis, striis sat grosse nec crebre punctulatis (striæ primæ puncturis vix confusis), interstitiis leviter convexis vix manifeste punctulatis. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

Allied to the preceding two species but readily distinguishable by the coarse comparatively sparse punctures of its elytral striæ. Its prothorax is by no means sparsely punctured but evidently less closely than that of *P. quadraticollis*. In this and the preceding two species the interval between the eyes is evidently wider than twice the width of an eye. In this species there is a perplexing variability in the depth of the larger punctures of the head and in the degree of convexity of the elytral insterstices, hardly two specimens being quite alike in these respects.

S. Australia; Eyre's Peninsula.

P. Meyricki, sp. nov. Elongata; subparallela; sat nitida; piceo-brunnea, vix cupreo-micans, antennis testaceis (articulis ultimis 4 piceo-tinctis), pedibus testaceis (femoribus plus minusve infuscatis); capite lato, confertim subrugulose æqualiter punctulato, sulcis interocularibus obsoletis, oculis inter se valde distantibus; antennis minus gracilibus, quam corporis dimidium sat longioribus, articulo 1° quam 2us 3us que conjuncti (hoc quam ille vix longiori) vix breviori; prothorace fere ut *P. quadraticollis* sed marginibus antico et postico latitudine æqualibus; elytris leviter striatis, striis minus crebre vix fortiter punctulatis (striarum primæ, et antice secundæ, puncturis confusis), interstitiis sat convexis vix perspicue punctulatis. Long., 1 l.; lat., $\frac{2}{3}$ l.

Near *P. quadraticollis* but differing from it and other allied species by the puncturation of its head which scarcely differs from that of its prothorax except in being a trifle closer with a distinct tendency to rugulosity. I have a specimen from W. Australia (which I take to be an immature example of this insect) entirely of a pale testaceous color.

W. Australia; taken by Mr. Meyrick.

CREPIDODERA.

C. indicica, sp. nov. Elongato-ovalis ; sat nitida ; subtus obscura ; supra cœrulea (colore fere indici), antennarum articulo basali apicem versus et 2° 3° que totis testaceis vel piceo-testaceis ; capite lævi, inter oculos minus distincte transversim sulcato ; antennis quam corporis dimidium paullo longioribus, articulis 1° 3° 4° que inter se longitudine sat æqualibus, 2° sat brevi ; prothorace sat transverso, lævi, ante basin fortiter transversim sulcato (sulco transverso utrinque sulco longitudinali forti terminato), lateribus arcuatis, angulis distinctis vix acutis ; elytris irregulariter subseriatim et confuse subtiliter punctulatis. Long., $1\frac{3}{4}$ l. ; lat., $\frac{4}{5}$ l.

This species is well characterised by its elytral puncturation, the rows of which are extremely irregular owing to punctures about the same size as those of the rows (as well as some much smaller) being confusedly scattered about the interstices ; near the apex the rows are scarcely traceable at all.

N. Queensland ; sent to me by Mr. Masters.

C. crassior, sp. nov. Præcedenti *(C. indicicæ)* affinis ; differt antennarum articulis 3—6 magis gracilibus, elytris regulariter seriatim grosse punctulatis (puncturis prope apicem confusis subtilioribus). Long. $1\frac{1}{5}$ l. ; lat., $\frac{3}{5}$ l. (vix).

Considerably smaller than the preceding and having the intermediate joints of the antennæ more slender so that the antennæ appear somewhat thickened towards the apex ; also the puncturation of the elytra is very much coarser and (except towards the apex) is disposed in regular rows.

N. Queensland ; taken near Cairns by Mr. Koebele.

OPISTHOPYGME (gen. nov. *Halticitarum*).

Corpus ovale, glabrum, minus convexum ; antennæ 11-articulatæ, sat approximatæ, filiformes, quam corporis dimidium sat longiores, minus robustæ, articulo 1° modico, 2° quam 1us sat breviori, 3° quam præcedentes graciliori quam 1us vix breviori, 4° quam 3us subbreviori, 5° quam 1us sublongiori ; prothorax latissime quadratus, paullo ante basin transversim profunde sulcato (sulco margines laterales attingenti, et utrinque cum basi sulco longitudinali profundo conjuncto) ; scutellum modicum ; elytra profunde punctulato-striata inæqualia, epipleuris latis bene determinatis fere ad apicem continuis subhorizontalibus (extrorsum paullo inclinatis) ; pedes modici ; tibiæ anteriores 4 muticæ, posticæ mucronatæ, his extus leviter canaliculatis ; femora postica valde incrassata, subtus leviter canaliculata ; tarsi postici quam tibiæ haud multo breviores, articulo basali quam sequentes 2 conjuncti paullo

longiori, articulo apicali valde inflato-dilatato; unguiculi appendiculati; coxæ anticæ minus elevatæ, inter se sat longe distantes, postice clausæ; mesosternum modicum.

The species for which I propose this new generic name is of great interest because the inflated claw joint of its hind tarsi in combination with its closed front coxæ refer it to M. Lacordaire's Group "*Monoplatites*" hitherto (so far as I can ascertain) only known as American. I cannot place it in any of the numerous previously described genera of the Group. Its maxillary palpi do not accord very satisfactorily with those of either of the sections into which M. Lacordaire divides the genera by the form of the maxillary palpi; the second joint is obconic, the third shorter than the second (but not much thicker than its apex) the fourth conic and a trifle longer than the second.

O. Jacobyi, sp. nov. Nitida; testaceo-ferruginea, antennis apicem versus infuscatis, elytris indeterminate brunneo-maculatis horum striis interrupte infuscatis; capite lævi, inter oculos transversim arcuatim sulcato; prothorace lævi (sulcis punctulatis exceptis), angulis anticis manifeste explanatis, posticis acutis, lateribus rectis; elytrorum striis apicem versus profundioribus, interstitiis convexis (apicem versus subcostatis). Long., $1\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.

The sulcation of the prothorax is unusual, there being an extremely strong sulcus running all across in front of the base, and also an equally strong longitudinal sulcus on either side running from the transverse sulcus to the base. On the elytra an ill defined depression runs hindward just within the humeral region and then bends towards the suture which it reaches so as to join its fellow of the other elytron thus causing the inner basal part of each elytron to appear elevated.

N. Queensland; named in honor of Mr. M. Jacoby well known as an accomplished specialist in the Phytophaga.

SUTREA.

The following species seem to be referable to this genus which has not been previously recorded as Australian, though well represented in New Guinea. Its principal characters are; antennæ approximate (of 11 joints), front coxal cavities open behind, mesosternum normal, hind tibiæ not sulcate (mucronate at apex), anterior four tibiæ unarmed, claw joint not dilated, prothorax devoid of impressions, margins of elytra evidently dilated.

S. Mastersi, sp. nov. Elongato-ovalis, minus parallela; sat convexa; nitida; testacea, antennis (basi testacea excepta) obscuris, elytrorum macula communi magna basali et parte

dimidia apicali nigris ; capite lævi inter oculos transversim sulcato ; antennis quam corporis dimidium paullo longioribus, articulis 3° 4° que inter se sat æqualibus ; prothorace quam longiori plus quam duplo latiori, transversim quadrato, vix perspicue punctulato, lateribus leviter rotundatis ; elytris subtiliter minus crebre punctulatis. Long., $2\frac{4}{5}$ l. ; lat., $1\frac{1}{2}$ l. (vix).

The markings on the elytra of this species seem to be very different from those of the previously described ones.

N. Queensland ; sent to me by Mr. Masters.

S. speciosa, sp. nov. Elongato-ovalis ; minus parallela ; modice convexa ; nitida ; testacea, abdomine (basi apiceque exceptis) obscuro, elytris (basi et marginis lateralis parte antica exceptis) violaceis ; capite lævi inter oculos transversim sulcato ; antennis quam corporis dimidium sat longioribus, articulis 3° 4° que inter se sat æqualibus ; prothorace quam longiori vix duplo latiori, postice subangustato, vix perspicue punctulato, lateribus sat rotundatis ; elytris paullo pone basin transversim impressis, vix punctulatis sed sparsim leviter granulatis. Long., 3 l. ; lat., $1\frac{1}{2}$ l.

Probably near *S. violaceipennis*, Jac, but differing from it *inter alia* by the flavous base (and front part of the sides) of its elytra and its yellow scutellum.

N. Queensland ; sent to me by Mr. Masters.

HALTICODES (gen nov. *Halticitarum*).

Corpus oblongo-ovale, modice convexum ; antennæ 11-articulatæ, sat approximatæ, filiformes, quam corporis dimidium vix vel paullo longiores, minus robustæ, articulo 1° minus elongato, 2° brevi, 3° quam 1us sublongiori, 4° quam 3us paullo breviori ; prothorax transversus, mox ante basin transversim sulcatus, sulco utrinque (sat longe a margine laterali) in basin recurvato ; scutellum magnum triangulare ; elytra quam prothorax manifeste latiora, confuse punctulata, marginibus lateralibus sat latis, epipleuris horizontalibus fere ad apicem continuata ; pedes modici ; tibiæ anteriores 4 brevissime, posticæ sat breviter, mucronatæ, his fere cylindricis ; femora postica sat incrassata subtus canaliculata ; tarsi postici sat elongati quam tibiæ dimidium sat longiores, articulo basali 2° 3° que conjunctis æquilongo, ultimo haud inflato ; unguiculi appendiculati ; coxæ anticæ sat elevatæ, postice apertæ ; mesosternum sat magnum.

I cannot find that any genus has been characterised to which it is possible to refer the species for which I propose this name. Its facies is altogether that of *Haltica* to which genus it is ex-

tremely close structurally, but I do not see how it is possible to place it in *Haltica* as limited by Dr. Chapnis on account of the very different form of its prothoracic sulcus which (instead of running all across the segment and merging laterally in the *lateral* margin) bends hindward on either side at some distance from the lateral margin and so arrives at the *basal* margin but without being limited externally by anything like a longitudinal sulcus. I should feel some doubt as to whether the present insect is distinct from the very briefly characterised *Docema*, Waterh. were it not that the claws of the latter are described as "simple." Further distinctions of the present genus from the European *Halticæ* (e.g. *pusilla*, Duf.) will be found in the widened lateral margin of the elytra, in the elytral epipleuræ (which are horizontal, with their external edge well defined instead of becoming sublateral hindward with no well-defined carina limiting them externally), and in the considerably greater dilatation of the hind femora (which however are not so strongly dilated as those of *Arsipoda*). It is to be noted that the extremely short mucro of the anterior tibiæ is placed *above* (not below) the base of the tarsus and is very easily overlooked without careful observation.

H. disparipes, sp. nov. Ovalis; sat nitida; subtus (prosterno et abdominis apice brunneis exceptis) piceo-nigra; supra testaceo-brunnea, pedibus (femoribus posticis piceis exceptis) pallide brunneis, antennis (articulis basalibus 3 vel 4 testaceis exceptis) nigris; capite lævi, inter oculos transversim arcuatim sulcato; prothorace subquadrato, quam longiori plus quam duplo latiori, antice vix angustato, subtilius sparsim punctulato, lateribus vix arcuatis, angulis omnibus distinctis subacutis; elytris crebre fortiter confuse punctulatis. Long., 2 l.; lat., $\frac{9}{10}$ l.

Victoria; I have met with it only in mountainous places.

HYPHALTICA (gen. nov. *Halticitarum*).

Generi præcedenti *(Halticodi)* affinis; differt elytrorum marginibus lateralibus minus latis, epipleuris pone medium magis angustis, tibiis anticis distincte minus breviter (intermediis breviter) mucronatis, femoribus posticis magis dilatatis subtus planatis sed vix canaliculatis.

This is another ally of *Haltica* according to Dr. Chapuis' arrangement; its prothoracic transverse furrow is quite as in *Halticodes* but it seems necessary to separate it from that genus on account of the characters noted above, especially the presence of a very well defined mucro (in the usual position) at the apex of the front tibiæ. In some respects this genus as well as the

preceding resembles *Lactica* but it does not appear possible to associate with that genus species in which there are no distinct longitudinal sulci on the prothorax. It should be noted that the mucro of the intermediate tibiæ is in *H. lauta* little more than a conical projection from the tarsal cavity which I have only been able to identify by removing the tarsus, but it undoubtedly is a small mucro.

H. lauta, sp. nov. Ovalis, sat elongata; minus convexa; sat nitida; lurida, antennis (articulis basalibus 3 vel 4 exceptis) nigris, corpore supra hic illic (præsertim elytris postice) indeterminate infuscato, corpore subtus piceo; capite sparsim subtiliter punctulato, inter oculos leviter sulcato; antennarum articulo 3° quam 4us haud longiori; prothorace quam longiori paullo plus quam duplo latiori, antice haud multo angustato, fere ut caput punctulato, lateribus leviter arcuatis, angulis omnibus distinctis nec acutis; elytris subtiliter (apicem versus vix distincte) subcrebre punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

In this species the transverse sulcus of the prothorax is well defined (a trifle more strongly than in the European *H. pusilla*, Duf.), and instead of running on to the lateral margin bends round obliquely to the base some little distance from the lateral margin, but without being bounded by anything that could rightly be called a longitudinal sulcus.

S. Australia; taken near Quorn.

H. (?) *anomala*, sp. nov. Ovalis, sat elongata; sat nitida; nigra, capite antennarum articulis basalibus 3 prothorace pedibusque testaceis; capite vix manifeste punctulato, inter oculos fortiter sulcato; antennis quam præcedentis magis robustis, articulo 3° quam 4us haud longiori; prothorace quam longiori duplo latiori, antice parum angustato, subtiliter sat sparsim punctulato, transversim obsolete sulcato, lateribus sat arcuatis, angulis subacutis; elytris subtiliter sat crebre punctulatis; tibiis intermediis distincte mucronatis. Long., $1\frac{1}{2}$—$1\frac{4}{5}$ l.; lat., $\frac{7}{10}$—$\frac{4}{5}$ l.

I have some little hesitation in considering this species congeneric with *H. lauta* on account of the sulcus of its prothorax being very faintly marked and the mucro of its intermediate tibiæ being quite well defined. These characters seem too slight to justify the creation of a new genus for a single species, but I look upon it as very probable that when the *Halticites* of Australia are more fully known it will be found that these two must be separated notwithstanding their similarity both in facies and general characters.

Victoria; Dividing Range.

H. (?) occidentalis, sp. nov. Subovata; sat nitida; lurida, antennis apicem versus vix infuscatis, capite postice rufopiceo, corpore supra hic illic indeterminate infuscato, corpore subtus magis obscuro; capite lævi, inter oculos bituberculato sed vix distincte sulcato; antennarum articulo 3° quam 4us manifeste longiori; prothorace quam longiori fere duplo latiori, antice manifeste angustato, subcoriaceo et sat obsolete punctulato, sat fortiter transversim sulcato, lateribus fortiter arcuatis, angulis obtusis; elytris fortiter sat crebre punctulatis; tibiis intermediis distincte mucronatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{4}$ l.

The species of Southern Australia appertaining to Lacordaire's group "*Halticites*" (outside the genus *Haltica*) differ in respect of facies and characters to an extent that would perhaps justify the creation of a separate genus for each of them. I am reluctant to follow this course, and so am placing in this genus *Hyphaltica* several forms that (appertaining to the *Halticites*) agree in the transverse sulcus of their prothorax being (not continued to the lateral margin but) bent round to the base before reaching the lateral margin, in their elytra not being exceptionally widely margined, and in their front tibiæ having a well-defined mucro placed in the normal position. The present species differs somewhat in facies from the preceding two, owing to its subovate form, and the strongly rounded sides of its prothorax.

W. Australia.

H. mediocris, sp. nov. Ovalis, sat elongata; sat nitida; lurida, scutello antennis (parte apicali excepta) et femorum parte superiori (basi excepta) infuscatis; capite lato, in medio fere lævi, ad latera punctulato, inter oculos transversim sulcato; antennis sat robustis, quam corporis dimidium paullo longioribus, articulo 3° quam 4us paullo longiori; prothorace fortiter transverso, postice paullo angustato, sublævi, sat fortiter transversim sulcato, lateribus sat arcuatis (latitudine majori ante medium posita), angulis bene determinatis subacutis; elytris subtiliter obsolete (circa scutellum magis perspicue) punctulatis; tibiis intermediis breviter distincte mucronatis. Long., $1\frac{3}{10}$ l.; lat., $\frac{3}{5}$ l.

The wide head of this species (the interval between the eyes being considerably more than the greatest diameter of an eye) and its not very convex eyes, together with the shape of its prothorax (wider in front than behind) give it a characteristic facies suggestive of generic distinctness from the others that I have provisionally associated in this genus; but it is certainly very close allied to them.

S. Australia; sent to me by Mr. Masters.

H. Adelaidæ, sp. nov. Ovalis ; sat elongata ; sat nitida ; supra nigra ; subtus picea, antennis pedibusque rufescentibus, femoribus (præsertim posticis) plus minusve infuscatis vel nigricantibus ; capite lato, in medio fere lævi, inter oculos sulcato ; antennis sat robustis, quam corporis dimidium paullo longioribus, articulo 3° quam 4us multo longiori, hoc quam 2us subbreviori ; prothorace fortiter transverso, antice vix angustato, distincte minus crebre punctulato, fortiter transversim sulcato, lateribus leviter arcuatis, angulis minus acutis (anticis incrassatis extrorsum leviter directis) ; elytris crebre fortiter punctulatis ; tibiis intermediis breviter distincte mucronatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l. (vix).

A very distinct species on account of *inter alia* its entirely black upper surface.

S. Australia ; Adelaide district.

HALTICA.

This genus as restricted by Dr. Chapuis may be taken to be limited to species that M. Allard's monograph would place in *Graptodera*. M. Allard suppresses *Haltica* altogether, but Dr. Chapuis' plea for retainining the name seems to me quite conclusive. The species are extremely variable and very difficult to determine. As regards the Australian species the best distinctive characters appear to me the sexual peculiarities of the males.

H. corrusca, Er. I am not sure that I know this species (which was described from Tasmania). The only Tasmanian *Haltica* known to me differs in important respects from Erichson's description. But there is a species occurring plentifully, and widely distributed in Southern Australia (Victoria, N.S. Wales and S. Australia, and probably in Tasmania), which agrees well with the description of *H. corrusca* in every respect except that (so far as regards the specimens I have seen) the violaceous coloring of the underside referred to by Erichson is wanting. It is an insect of brassy-æneous color (long., about $2\frac{1}{2}$ l.) with well defined fairly close and rather fine elytral puncturation, and the longitudinal post-humeral sulcus very faint. Its males (apart from the dilatation of the basal joint of the tarsi) are distinguished by the sculpture of the apical ventral segment, which is devoid of tubercles and has its apical half (or thereabouts) flattened so as to be on a lower plane than the front part from which in certain lights it seems to be separated by a sulcus ; the middle part of its apical margin (which must not be confused with the free edge of the pygidium seen beyond it) is rounded but owing to inæqualities on its surface immediately before the apex it appears (from a point of view whence the true apex does

not catch the eye) to be trilobed. Its intermediate tibiæ are straight or nearly so.

H. splendida, Oliv. I have not seen any insect at all likely to be this species; the description of it seems possibly consistent with its being a true *Haltica*.

H. ferruginis, Blackb. I regard this insect as possibly representing a gen. nov. near *Haltica*. As far as I know the species that may be rightly regarded as typical members of *Haltica*, they are invariable in being of some dark (more or less metallic) color, and in having a prothoracic sulcus completely traversing the segment in complete separation from its base. *H. ferruginis* however not only is of a nearly uniform brownish-testaceous color, but has its prothoracic sulcus less distinctly complete than in a typical *Haltica* inasmuch as near the lateral margins it seems to lose itself in a mere basal depression (there being in that part no elevated interval between it and the true basal margin). The combination of these two differences from a normal *Haltica* points to the likelihood of other species allied to it existing in N.W. Australia (which is its habitat). Its prothoracic sulcus is not much like that of either of the new genera (*Hyphaltica* and *Halticodes*) characterised above. As far as I can see its four anterior tibiæ are unarmed but the type is not in a condition to allow of my thoroughly investigating the question whether a very small mucro may be hidden among the apical setæ. I cannot find any named genus other than *Haltica* in which it might be placed, although it is very difficult to arrive at certainty regarding some of Baly's genera owing to their author having merely enumerated their characters without mentioning what genera they are allied to.

H. pagana, sp. nov. Ovalis, minus elongata; nitida; cærulea vel purpurea, antennis tibiis tarsisque obscuris; capite sublævi, inter oculos transversim sulcato, ante sulcum bituberculato; antennis quam corpus (maris haud multo, feminæ paullo magis) brevioribus, sat robustis (articulo basali modico, 2° brevi, 3° quam 1us vix breviori, 4° quam 3us vix longiori); prothorace sat transverso, antice sat angustato, in disco lævi, latera versus distincte punctulato, ante basin sat profunde sulcato, lateribus sat arcuatis; elytris sat crebre sat fortiter (quam *H. pusillæ*, Duf., paullo minus crebre vix minus fortiter) punctulatis, ad latera obsolete sulcatis (sulco ante medium extus vix manifeste carinato).

Maris tibiis intermediis sat rectis; segmento ventrali apicali in medio postice rotundato, nullo adspectu trilobato, mox ante apicem bituberculato. Long., $2\frac{2}{5}$ l.; lat., $1\frac{1}{5}$ l.

Much like *H. australis*, Blackb., but a more richly colored insect, with less close elytral puncturation, and the apical ventral

segment of the male quite different. The antennæ of the male are about three-quarters the length of the body.

Victoria and Tasmania; in mountainous places.

H. gravida, sp. nov. Elongato-ovalis; sat nitida; ænea, corpore subtus antennis pedibusque obscuris; capite antennisque fere ut præcedentis, sed his paullo brevioribus; prothorace minus transverso (quam longiori circiter quarta parte latiori), subcoriaceo et sparsim subtiliter (latera versus magis grosse) punctulato, antice parum angustato, ante basin sat profunde sulcato, lateribus minus arcuatis; elytris sat crebre sat subtiliter subobsolete punctulatis, ad latera fortiter sulcatis (sulco et intus et extus longe ultra medium carina forti marginato).

Maris tibiis intermediis (exempli typici) extrorsum fortiter curvatis: segmento ventrali apicali ad apicem certo adspectu fortiter trilobato. Long., 3—3½ l.; lat., 1⅘ l.

Resembles in general appearance and color the species mentioned above as being probably *H. corrusca*, Er., but *inter alia* much larger, with the lateral furrows and carinæ of its elytra very much stronger. The apical ventral segment does not present much difference, but the extraordinary middle tibiæ of its male which are very strongly bent outwards at the apex (if not a deformity of the unique male that I have seen) furnish a very striking character. In any case the present species is an extremely distinct one. I have two female examples from N.S. Wales which I attribute to this species but cannot be sure of their identity without knowing their male.

S. Australia; Murray River District, &c.

The following table shows the distinctive characters of the species attributed to Australia that there seems to be more or less reason to regard as true *Haltica* (the doubt, in my opinion, being about the first two):—

A. Underside testaceous.	
B. Elytra testaceous	*ferruginis*, Blackb.
BB. Elytra metallic	*splendida*, Oliv.
AA. Underside dark.	
B. Sublateral sulcus of elytra feeble and not limited by a sharply defined carina.	
C. Apical ventral segment of male not tuberculate.	
D. Upper surface metallic blue or purple ...	*australis*, Blackb.
DD. Upper surface æneous or bronzy ..	*corrusca*, Er.
CC. Apical ventral segment of male bituberculate	*pagana*, Blackb.
BB. Sublateral sulcus of elytra strong and limited by a sharp carina.	
C. Apical ventral segment of male with a large impression before the apex (color brassy) ...	*gravida*, Blackb.
CC. Apical ventral segment of male even or nearly so (color coppery)	*ignea*, Blackb.

LONGITARSUS.

L. Victoriensis, sp. nov. Ovalis; sat nitidus; fusco-testaceus, capite rufescenti, antennis extrorsum labro et femoribus posticis infuscatis; antennis sat gracilibus quam corpus vix brevioribus, articulo 1° quam sequentes 2 conjuncti vix breviori, 3° quam 2us sat longiori quam 4us paullo breviori; capite vix punctulato, in vertice plus minusve distincte transversim strigato; prothorace transversim subquadrato, crebre fortiter punctulato, lateribus leviter arcuatis; elytris fortiter subseriatim punctulatis. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

Very like *L. luridus*, Gyll.; differing from that species especially by its elytral puncturation evidently a little closer and less coarse, and much more disposed to a seriate arrangement; also by the usually well-marked transverse strigosity of the hind part of its head.

Victoria; Alpine district.

APHTHONA.

A. Cowleyi, sp. nov. Ovalis, sat elongata; nitida; antennis extrorsum labro et (ex parte) femoribus posticis piceis, tibiis plus minusve infuscatis; capite lævi inter oculos sulcato; antennis quam corporis dimidium vix longioribus, articulo 1° modico, 2° minus brevi, 3° quam 2us sat longiori (1° longitudine sat æquali), 4° 3° æquali; prothorace subtilissime punctulato, subquadrato, antice leviter angustato, pone marginem anticum lateribus subangulatis; elytris quam prothorax minus nitidis vix manifeste punctulatis; coxis anticis apertis; tibiis omnibus breviter mucronatis, posticis extus sat longe sat manifeste longitudinaliter sulcatis; tarsorum posticorum articulo basali sequentibus 2 longitudine æquali. Long., $1\frac{3}{4}$ l.; lat., $\frac{4}{5}$ l.

In this species the hind tibiæ are somewhat more decidedly sulcate externally than is usual in *Aphthona*, but I can find no other character inconsistent with a place in that genus. Apparently near *A. papuensis*, Jac, but considerably larger, with more transverse prothorax, &c.

Northern Australia; taken by Mr. Cowley, near Cairns.

XUTHEA (?)

I feel considerable hesitation in assigning the following species to this East Indian genus, which is not known to me in nature. But it agrees with the diagnosis in all essential characters and certainly ought to be placed very near *Xuthea*. Its front coxæ are open behind, its prothorax has a strong transverse sulcus sharply limited by a short longitudinal sulcus on either side; its

antennæ are 11-jointed ; its mesosternum is normal ; all its tibiæ are mucronate ; and the claw joint of its hind tarsi is normal. These are the structural characters of *Xuthea* and I cannot find that they have been attributed to any subsequently named genus. It is likely enough that a comparison of types might render it desirable to separate the insect described below from *Xuthea* but meanwhile I think it should be provisionally referred to that genus. It evidenly bears much specific resemblance to the type of *Xuthea*, though it is considerably smaller.

X? formosa, sp. nov. Elongato-ovalis ; nitida ; tota læte cœrulea, antennis obscuris basin versus vix rufescentibus exceptis ; capite lævi, inter oculos transversim arcuatim sulcato ; oculis grosse granulatis ; antennis quam corporis dimidium vix longioribus, apicem versus gradatim manifeste incrassatis, articulo 1° parum elongato, 2° quam 1us sat breviori, 3° 1° longitudine æquali, 4° quam 3us paullo breviori, 5° 3° longitudine æquali et paullo magis robusto ; prothorace sublævi, antice angustato, ante basin profunde transversim sulcato (sulco transverso utrinque in sulco profundo longitudinali terminato) ; elytris subtiliter minus regulariter seriatim punctulatis, nullo modo striatis ; coxis anticis apertis, tibiis omnibus breviter mucronatis tarsorum posticorum articulo basali sequentibus 2 longitudine æquali. Long., 1 l. ; lat., $\frac{2}{3}$ l. (vix).

Its brilliant metallic blue color (almost as bright on the undersurface and the legs as on the elytra) renders this a very beautiful little insect. The color of the legs underlying their blue iridescence is of a somewhat pitchy testaceous tone. The basal joint of the antennæ is somewhat shorter than in most *Halticides*. The mucro at the apex of the anterior 4 tibiæ is placed among coarse setæ and needs looking for.

N. Queensland ; taken by Mr. Koebele, near Cairns.

SPHÆRODERMA.

S. baldiensis, sp. nov. Late ovalis ; nitida ; rufo testacea, antennarum articulis ultimis 5 obscuris ; capite transversim profunde arcuatim sulcato (sulco pone oculos, ut *S. testaceæ*, Fab., continuo), in vertice punctulato et longitadinaliter striatim ruguloso ; antennis quam corporis dimidium brevioribus, articulis ultimis 5 gradatim incrassatis, articulo 1° modico, 2° minus brevi (quam 1us fere duplo breviori), 3° quam 2us graciliori sed vix longiori, 4° 6° inter se sat æqualibus (quam 3us subbrevioribus) ; prothorace transverso, transversim convexo, subfortiter sat sparsim punctulato ; elytris sparsim sat fortiter (quam *S. testaceæ*, F., magis sparsim vix magis fortiter) punctulatis ; femoribus posticis modicis. Long., $1\frac{2}{5}$ l. ; lat., $\frac{4}{5}$ l.

The structural characters seem to be altogether those of the European species of the genus unless the shortness of the antennæ be considered aberrant; many species with short antennæ from Java, &c., have, however, been attributed to *Spharoderma*.

Victoria; Alpine district.

PSYLLIODES.

P. lubricata, sp. nov. Elongato-ovata; pernitida; supra æneo-viridis, prothorace aurato, antennis piceis basin versus testaceis; subtus piceo-nigra, pedibus rufis (femoribus plus minusve æneo-tinctis; capite sublævi; prothorace fortiter transverso, lateribus pone apicem fortiter dentatis, disco sparsius minus fortiter (lateribus sat crebre sat grosse) punctulato; elytris leviter striatis, striis crebre sat fortiter punctulatis, interstitiis planis (apicem versus leviter convexis) subtilissime punctulatis; tibiarum posticarum processu apicali quam tibia tota plus quam triplo breviori, ad latera pectinato, ad apicem fortiter bidentato. Long., 1^3 l.; lat., $\frac{4}{5}$ l.

The reddish-testaceous color of the legs (including the femora), —only in places with a brassy metallic tone overlying the red color,—distinguishes this species from its allies; it is also notable for the flat interstices (only feebly convex near the apex) of its elytral striæ.

Victoria; Black Spur.

(Sub-tribe) GALERUCIDES.

The Australian Polynesian and Papuan *Phytophaga* of the sub-tribe *Galerucides* present considerable difficulties to thier student owing to the great uncertainty that exists in respect of some of the genera—an uncertainty notably illustrated by the frequency of the mark "?" after the generic designations of species described by even well known specialists. In a recent investigation of the *Galerucides* of my collection I have found among those insects many species previously undescribed, but in several instances have been unable to reach any confident conclusion as to what is their right generic position. As this difficulty arises mainly from the faultiness of generic diagnoses there does not appear to be any escape from it, and I must therefore follow the same course that others have adopted and in some cases indicate a doubt as to the correctness of my generic determinations.

Authors in general seem to be fairly agreed that the structure of the prosternum is the character on which the primary subdivision of the tribe should be founded. Dr. Chapuis (Gen. Col. vol. XI.) recognises two distinct forms of this structure indicated by the cavities of the front coxæ being either open or closed

behind. Subsequently Dr. Baly (Journ. Linn. Soc. XX) while accepting the prosternal structure as the basis of classification regards (not the closure of the cavities but) the relation between the prosternum and the hind margin of the antepectus as the true index of that structure, and indicates two forms of the relation in either of which the cavities may be either open or closed. He considers that both conditions of the cavities may exist within the limits of a genus.

Now I venture to think that for the purposes of classification, at our present stage of knowledge, something else than the anatomical importance of characters ought to be taken into account —viz., the facility or otherwise of observing them. It is usually necessary to injure a specimen to find out even whether its coxal cavities are open or not; it is always necessary to do so in order to examine the relation between the prosternum and the hind-margin of the antepectus. I cannot but regard this proposal of Dr. Baly's as somewhat of the nature of his classification of *Paropsis* where he finds a primary character in the internal organs of the hind body.

The divergence between these specialists however suggests a doubt whether they agree practically as to the limits of a given genus and creates a great difficulty in dealing with the species they have described. I find Dr. Baly's classification impracticable and greatly prefer to make use of Dr. Chapuis'. It appears to me however that even Dr. Chapuis is not quite clear in his definition of the terms "open" and "closed" in dealing with the coxal cavities. He says that when the coxal cavities are open the base of the true prosternum (by which he means the hind margin, behind the coxæ, of the middle part of the prosternum as a whole) does not join the inward prolongation of the prosternal epimera. But there are very few cases in which this juncture is absolutely wanting, and I find from the dissection of numerous specimens that his test practically is whether the base of the true prosternum meets the *apex* of the inward prolongation of the epimera, or whether the apex of the epimera is freely applied against the coxa. In the former case (which is exemplified in *Adimonia*, *Monolepta*, &c.) Dr. Chapuis regards the coxal cavity as closed; in the latter (exemplified by *Aulacophora*, *Luperus*, &c.) he regards it as open. I treat the terms "open" and "closed" (as applied to the coxal cavities) in this sense.

OIDES.

O. insignipennis, sp. nov. Elongato-ovata; flava, antennis (articulis basalibus flavo-variegatis exceptis) vittisque in elytris 2 latissimis (his postice conjunctis) piceo-nigris, tibiis externe tarsisque infuscatis; antennis robustis quam corpus

circiter tertia parte brevioribus, articulo 3° quam 2us duplo longiori quam 4us paullo breviori quam 5us vix breviori; capite inter oculos profunde transversim sulcato, fronte longitudinaliter vix impressa; oculis minus prominulis; prothorace quam longiori paullo plus quam duplo latiori, fere æquali, subfortiter minus crebre sat æqualiter (et latera versus confertim subtilissime) punctulato; elytris dupliciter (sc. sat crebre subtilissime et sat crebre vix subtiliter) nullo modo rugulose punctulatis. Long., 4 l.; lat., $2\frac{2}{5}$ l.

The elytral vittæ are considerably wider than the yellow stripes, so that the elytræ are more black than yellow. The greatest width across the elytra is nearly four times the width of the prothorax and the elytra are fully six times longer than the prothorax. The hind angles of the prothorax are by no means rounded off but well-defined obtuse angles. At once distinguished from *O. Fryi*, Clk., by *inter alia* the absence of a transverse prothoracic impression, the less close puncturation (devoid of any rugulosity) of the elytra, and its less prominent eyes.

Queensland; Port Mackay; sent to me by Mr. Lower.

O. ocularis, sp. nov. Elongato-ovata; flava, antennarum articulis 2°—8° in parte (9°—11° totis) vittisque in elytris 2 modice latis (his postice conjunctis) piceo nigris, tibiis externe tarsisque infuscatis; antennis minus robustis quam corporis dimidium paullo longioribus, articulo 3° quam 2us duplo longiori quam 4us sat breviori quam 5us vix breviori; capite fere ut præcedentis *(O. insignipennis)*; oculis sat prominulis; prothorace fere ut præcedentis sed partis lateralis puncturatione subtili multo minus conferta minus subtili; elytris fere ut præcedentis punctulatis. Long., 4 l.; lat., $2\frac{2}{5}$ l.

Allied to the preceding but with the vittæ (especially the external one) of the elytra narrower, the antennæ shorter and less robust, the eyes considerably more prominent, the excessively close and fine puncturation on the sides of the prothorax wanting, &c. At once distinguishable from *O. Fryi*, Clk., by the puncturation of the elytra not showing any tendency to rugulosity, the absence of the transverse prothoracic impression, &c.

N. Queensland; taken by Mr. Cowley.

O. ignota, sp. nov. Elongato-ovata; rufo-flava, antennis articulorum (1^i^—3^i^ parte inferiori dilutiori) vittisque in elytris 2 modice latis (his postice conjunctis) piceo-nigris, tibiis externe tarsisque infuscatis; antennis robustis quam corpus circiter tertia parte brevioribus, articulo 3° quam 2us haud duplo longiori quam 4us tertia parte breviori quam 5us manifeste breviori; capite fere ut *O. insignipennis*; oculis minus prominulis; prothorace quam longiori fere triplo latiori,

ante medium transversim late impresso (parte concave utrinque abbreviata), sat crebre subgrosse punctulato, margine postico retrorsum late rotundato, angulis posticis rotundatis ; elytris dupliciter (sc. sat crebre subtiliter et sat crebre fortite) nec rugulose punctulatis. Long., $4\frac{4}{5}$ l.; lat., 3 l. (vix).

A fine large species, at once distinguishable from its allies by the strong puncturation of its upper surface ; the comparatively long second joint of its antennæ is also a notable character.

N. Australia ; I am not sure of the exact locality.

O. tigrina, sp. nov. Ovalis ; flavo-testacea, antennarum articulis 1°—8° in parte (9° 11° totis) vittis in elytris 4 angustis capite postice prothoracis maculis nonnullis metasterni parte magna femoribus (basi excepta) tibiarum parte magna tarsisque piceis ; antennis minus robustis quam corporis duæ partes longioribus, articulo 3° quam 2us haud duplo longiori quam 4us tertia parte breviori quam 5us paullo breviori ; capite inter oculos profunde transversim sulcato, fronte longitudinaliter manifeste impressa ; oculis sat prominulis ; prothorace quam longiori duplo latiori, ante medium transversim interrupte leviter impresso, coriaceo et sparsim inæqualiter leviter punctulato, angulis posticis rotundatis, margine postico retrorsum late rotundato ; elytris dupliciter (sc. subtilissime minus crebre et sat crebre fortius) vix subrugulose punctulatis. Long., 4 l. ; lat., $2\frac{3}{10}$ l.

Differs from its immediate allies in its somewhat regularly oval shape, also in there being four dark vittæ on each elytron. These are of about equal width and do not reach the apex. The subsutural one becomes gradually darker and more defined from the base hindward ; the second and third coalesce near their hinder end (their common stem coalescing with the other two a little before the apex of the elytron) ; the external one exists only in the hinder third part of the elytron. The previously described Australian species of *Oides* having testaceous or yellow elytra ornamented with dark vittæ (more than one on each elytron) are *Fryi*, Clk., *seminigra*, Clk., and 6-*vittata*, Duviv. Of these I know only the first except by description. The second is described as having its prothorax black with the margins reddish yellow. (I have seen no Oides with prothoracic colors at all approaching this description.) The third is said to have very short antennæ not reaching the middle of the elytra, the disc of the prothorax with only a few extremely fine punctures, and the elytra with more than two vittæ—characters which distinguish it from all the species of *Oides* known to me. The following table shows the characters of the species of this group of Oides :—

A. Prothorax yellow or yellowish, with no (or scarcely any) dark coloring.
  B. Antennæ elongate (not less than $\frac{2}{3}$ the length of the body).
    C. Puncturation of prothorax more or less feeble.
      D. Two vittæ on each elytron ; form elongate-ovate.
        E. Puncturation of elytra not in the least rugulose ... ... *insignipennis*, Blackb.
        EE. Puncturation of elytra distinctly rugulose ... ... *Fryi*, *Clk.*
      DD. Four vittæ on each elytron ; form oval *tigrina*, Blackb.
    CC. Puncturation of prothorax strong and deep *ignota*, Blackb.
  BB. Antennæ shorter.
    C. Elytra with two vittæ each ... ... *ocularis*, Blackb.
    CC. Elytra with more than two vittæ each ... 6-*vittata*, Duviv.
AA. Prothorax black, with only the margins yellowish .. .. *seminigra*, *Clk.*

O. velata, sp. nov. Late ovalis ; pallide flava, capite postice et elytrorum maculis binis (altera minori basali subrotundata, altera magna subapicali subovali longitudinaliter posita), antennarum articulis 4°—6° ad apicem (et 7°—11° totis) tibiarum apice tarsisque infuscatis ; antennis quam corporis dimidium parum longioribus, articulo 3° quam 2us duplo longiori 4° sat æquali quam 5us sat longiori ; capite inter oculos profunde transversim sulcato ; oculos sat prominulis ; prothorace quam longiori paullo plus quam duplo latiori, antice sat angustato, leviter vix crebre punctulato, disco utrinque fovea magna sat fortiter impresso, angulis posticis sat rotundatis ; elytris fere ut prothorax punctulatis. Long., $4\frac{4}{5}$ l. ; lat., $2\frac{1}{5}$ l.

The basal spot on each elytron is transversely subrotundate and is much nearer to the suture than to the external margin. The subapical spot is somewhat obliquely placed ; it is twice as long as wide, oval in form but with its front subtruncate, commencing not much behind the middle of the elytron and all but reaching the apex.

Queensland ; sent to me by Mr. Masters.

O. plantarum, sp. nov. Ovalis ; pallide straminea, elytris pallide brunneo-testaceis, antennarum articulis 2°—4° ad apicem (et 5°—11° totis) tibiarum apice tarsisque infuscatis ; antennis quam corporis dimidium paullo longioribus, articulo 3° quam 2us duplo longiori quam 4us vix breviori quam 5us paullo longiori ; capite inter oculos leviter transversim sulcato, fronte longitudinaliter impressa ; oculis parvis ; prothorace quam longiori duplo latiori, antice sat angustato, obsolete punctulato, disco utrinque fovea et postice sulco transverso brevi impresso, angulis posticis rotundatis ; elytris sparsim subtilissime punctulatis. Long., 4 l. ; lat., 2 l.

Somewhat resembles *O. antennalis*, Baly, but is more narrowly oval in form with much shorter antennæ and much less closely and distinctly punctured elytra, &c.

N. Queensland.

AULACOPHORA.

A. denticornis, sp. nov. Testacea, elytrorum parte basali et macula magna subapicali rubropurpureis, pedibus posticis plus minusve infuscatis; capite prothoraceque lævibus; hoc quam longiori vix dimidio latiori; elytris distincte punctulatis; metasterno nonnihil rubro-infuscato.

Maris capite inter oculos profunde biimpresso, utrinque inter partem impressam et oculum sat alte cristato; antennarum articulis basalibus 5 deformibus (sc. basali elongato extus emarginato et dentato, 2° minuto extus dentato, 3° magno triangulari ad apicem extrorsum fortiter producto, 4° quam 3us longiori compresso ad apicem truncato 5° quam 3us vix longiori ad apicem extus fortiter producto (partis productæ margine antico profunde emarginato et biacuto.

Feminæ capite sat æquali, antennis simplicibus quam corporis dimidium paullo longioribus. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

The elytra are divided into three somewhat equal zones of color—the basal one-third part purplish red, the middle one-third testaceous, the apical one-third purplish red; the apical purplish red color however does not quite reach the suture. The male characters in the head and antennæ are more strongly marked than in any other *Aulacophora* known to me.

N. Queensland; taken by Mr. Cowley near Cairns.

A. cucullata, sp. nov. Fem. Testacea; elytrorum parte basali tertia nigra, tibiis tarsisque anterioribus 4 plus minus infuscatis, pedibus posticis (femorum basi excepta) fere nigris; capite prothoraceque obsolete punctulatis; hoc quam longiori fere duplo latiori; elytris sparsim subtiliter penctulatis; antennis quam corporis duæ partes longioribus, articulo 3° quam 4us vix breviori. Long., $3\frac{3}{5}$ l.; lat., $2\frac{3}{10}$ l.

I cannot find among the numerous described species of *Aulacophora* any the coloring and markings of which bear much resemblance to those of the present species.

AGELASTICA.

A. (Galeruca) melanocephala, Fab. There does not appear to be any doubt that this species is an *Agelastica*. It is clearly identical with the *Agelastica* that Dr. Baly described under the same specific name. Of course Fabricius is the earlier describer to whom the original name must be attributed. I believe this synonymy has not been previously noted. The species stands in

Mr. Masters' Catalogue as *Monolepta melanocephala*, Fab., and also as *Agelastica melanocephala*, Baly.

CALLIPEPLA.

C. sexsignata, Boisd. I have received from Mr. Masters and Mr. French (as taken in tropical Queensland) specimens of an insect which seems likely to be this scarcely described N. Guinea species.

PRASYPTERA.

P. Mastersi, sp. nov. Flava; elytris metallico-viridibus vel cyaneo-viridibus, labro (antice) palpis (basi excepta) mandibulis (basi excepta) antennis (articulo apicali flavo excepto) genubus tibiis tarsisque piceis; prothorace transversim irregulariter impresso, leviter punctulato; elytris sat crebre punctulatis. Long., 4 l.; lat., $2\frac{1}{5}$ l.

Differs in coloration and other characters from all the previously described members of the genus, which has not previously (to my knowledge) been recorded as occurring in Australia.

N. Queensland; sent to me by Mr. Masters.

SASTRA.

S. costatipennis, Jac., var. *obscuricornis*. A typo differt antennis (articulo basali subtus dilutiori excepto) nigro-piceis; elytrorum sutura (apice angustissime flavescenti excepto) cum superficie concolori, costa interna haud ultra medium extensa. Long., $5\frac{2}{5}$ l.; lat., $2\frac{3}{5}$ l.

Although from its large size and differences of coloration this insect appears to a casual glance very distinct from *S. costatipennis* I think it very likely to prove a mere local form of that insect, to which it is at any rate very closely allied.

N. Queensland.

MOMÆA.

M. eximia, sp. nov. Elongata; subparallela; testacea, elytris vitta lata discoidali læte viridi ornatis, antennis tarsisque picescentibus; antennis quam corpus paullo brevioribus, articulo 3° quam 4us manifeste breviori; prothorace leviter transverso, sat æquali, sparsim subtiliter punctulato, lateribus rotundatis, angulis subtuberculiformibus; elytris confertim minus subtiliter punctulatis; tarsorum posticorum articulo basali quam sequentes 2 vix longiori. Long., $2\frac{4}{5}$ l.; lat., 1 l.

The bright green vitta on each elytron commences on the shoulder and runs back widening almost to the apex, so that the common testaceous interval between the two vittæ is in the form of a very elongate triangle with its base on the base of the elytra; the testaceous lateral margin is very narrow.

This species seems clearly to appertain to *Momœa* on account of its front coxæ open behind, bifid claws, unarmed and externally carinate tibiæ, long antennæ, narrow parallel form, &c. The even surface of its prothorax and the not strongly transverse form of the same perhaps render its place in the genus a little doubtful, but I hesitate to separate it on these characters alone. *Momœa* has not been previously attributed to Australia; it occurs in New Guinea.

N. Queensland.

DIRCEMA.

It has been pointed out by Baron de Harold that *Galerucula australis*, Bohem., is a member of this genus. It appears probable that this is a correct reference.

RUPILIA.

R. excelsa, sp. nov. Minus nitida; supra rufa, elytris (parte prope suturam rufa excepta) cyaneis; subtus rufa (segmentorum ventralium parte antica laterali cyanescenti excepta); pedibus (femorum basi rufa excepta) piceis; capite inter oculos inæquali, longitudinaliter linea fortiter impresso, parte mediana sat crasse punctulata; prothorace quam longiori fere duplo latiori, crebre fortiter subæqualiter punctulato, sulco lato transverso discoidali bene determinato profunde impresso (hoc margines laterales fere attingenti, sed ad medium paullo minus lato paullo minus profundo); scutello elytrisque confertim sat fortiter (fere subrugulose) punctulatis. Long., $3\frac{1}{2}$ l.; lat, $1\frac{4}{5}$ l.

Distinct from its previously described allies by the broad rufo-testaceous stripe forming the inner border of each elytron. Its nearest ally seems to be *R. ruficollis*, Clk., from which it differs *inter alia* by the strong subrugulose puncturation of its scutellum, as well as by the coloring of its elytra.

N. Queensland; taken by Mr. Koebele.

NEORUPILIA.

N. ornata, sp. nov. Oblongo-ovalis (mas) vel oblongo-ovata (fem.); minus robusta; sat nitida; nigra, antennarum basi genubus tibiis tarsis et elytrorum maculis binis (his in humero et prope apicem positis) testaceis; capite prothoraceque fere lævibus; hoc minus transverso, postice sat angustato; elytris subtiliter sparsius (minus distincte) punctulatis, maris quam abdomen paullo (feminæ sat multo) brevioribus, ad apicem dehiscentibus; antennis quam corpus (maris) sublongioribus vel (feminæ) sat brevioribus, articulis basalibus 3 testaceis, articulo basali modice elongato, 2° minus brevi, 3° quam 2us paullo longiori, 4° quam 3us paullo

longiori (quam 1us, et quam 2us 3us que conjuncti, breviori). Long., $\frac{4}{5}$ l.—1 l.; lat., $\frac{2}{10}$—$\frac{2}{5}$ l.

The male of this minute *Galerucid* has a certain resemblance to a small *Tachys*. It is a very pretty and distinct species. In some specimens the pale marks on the elytra are almost white.

Victoria; Alpine region.

ADIMONIA.

Several Australian species seem to be referable to this genus, with which they agree in the following characters; front coxal cavities closed (their structure is as in the European *A. capreæ*, Linn.); front coxæ contiguous or all but contiguous; metasternum not prominent between the middle coxæ; elytral epipleuræ continued well behind the middle of the length of the elytra; tibiæ unarmed; claws of the tarsi bifid; lateral borders of prothorax well defined; head considerably narrower than prothorax; third joint of antennæ distinctly longer than fourth joint; basal joint of hind tarsi about equal in length to the next two joints together; tibiæ more or less carinate on their external margin. The species that I refer to this genus agree well with it in facies and also resemble in facies *Dircema (Galeruca) australis*, Bohem. In the last-named species the apices of the epimera of the prosternum undoubtedly do not meet the base of the true prosternum but project freely; nevertheless I cannot satisfy myself that it is anything but an extremely close ally of these species which I refer to *Adimonia*. In *Galerucella McDonaldi*, Lea the front coxæ are closed and therefore that insect ought not to stand in *Galerucella*; I think it can hardly be separated generically from *Adimonia*.

A. lugens, sp. nov. Elongata; minus nitida; subtiliter pubescens; supra nigro-picea, capite postice antice et ad latera anguste testaceo, prothorace testaceo-variegato, elytris nonnullorum exemplorum in disco vix dilutioribus et utrinque prope scutellum linea brevi testacea ornatis; subtus obscure livida, piceo-variegata; antennis nigris, articulo basali subtus et 2^i^ 3^i^ que basi summa testaceis; pedibus piceis, femoribus testaceo-maculatis: antennis minus robustis quam corporis dimidium paullo longioribus, articulo 3° quam 4us vix longiori; capite longitudinaliter sat fortiter impresso, cum prothorace crebre aspere punctulato; hoc quam longiori duplo latiori, transverism fortiter impresso, lateribus sat rotundatis; elytris confertim sat subtiliter vix aspere punctulatis. Long., $4\frac{4}{5}$ l.; lat., $2\frac{1}{5}$ l.

The elytra are almost uniformly pitchy black, when closely examined a small testaceous mark is observed on either side of the scutellum and in some specimens a faint indefinite tendency to

reddish on the disc. On the prothorax there is a large black spot at each angle and a still larger one occupying the disc but not quite reaching the base or front margin. The sulcus of the prothorax is of curved shape and is on the front half of the surface; the surface of the prothorax (the sulcus excepted) is even and the hind angles are rounded, This species, to a casual glance bears much resemblance to a very dark specimen of *D. (Galeruca) australis*, Bohem. Besides the distinctions involved in the above remarks it differs from *D. australis* by its longer and less robust antennæ, its closely punctulate head and prothorax, its closed front coxæ, &c. From *D. McDonaldi*, Lea (which has closed front coxæ and ought I think to be placed in *Adimonia*) it differs widely by its color, much larger size, much longer and less robust antennæ, more transverse prothorax of which the hind angles are rounded, &c., &c.

N. Queensland; taken by Mr. Cowley near Cairns.

A. Mastersi, sp. nov. Sat elongata; minus nitida; subtiliter pubescens; supra testaceo-brunnea; subtus, cum antennis pedibusque piceo-nigra; antennis modice robustis, quam corporis dimidium subbrevioribus, articulo 3° quam 4us sat longiori; capite inter antennas bituberculato, crebre nec grosse punctulato; prothorace quam longiori vix duplo latiori, inæquali (sc. utrinque spatio concavo magno leviter impresso, et antice spatio triangulari leviter elevato—hoc in medio concavo—instructo), crebre (in spatio elevato triangulari sparsim) punctulato, angulis anticis dentiformibus, lateribus mox ante basin ut dens parva productis; elytris sat crebre sat fortiter punctulatis, lineis nonnullis elevatis vix manifestis instructis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

A very distinct little species; from its general facies and the form of its prothorax it should stand I think near *A. (Galerucella) McDonaldi*, Lea. It bears considerable general resemblance to the European *A. capreæ*, Linn., but *inter alia* its prothorax is much smaller in proportion to the elytra.

N.S. Wales; sent to me by Mr. Masters from the Richmond River District.

A. richmondensis, sp. nov. Modice elongata; minus nitida; subtiliter pubescens; testacea, elytris vitta lata discoidali viridi ornatis, antennis genubus tibiis tarsisque infuscatis; antennis sat robustis, quam corporis dimidium paullo longioribus, articulo 3° quam 4us sat longiori; capite confuse nec grosse ruguloso, longitudinaliter leviter impresso; prothorace quam longiori duplo latiori, ante medium late transversim leviter concavo, crebre subtilius (antice magis crasse) punctulato, lateribus sat rotundatis, angulis anticis sat acutis (vix

prominulis) posticis obtusis ; elytris confertim subtilius punctulatis ; unguiculis bifidis sed lobo interiori brevi.

Var. ? *maculatifrons* differt capite macula magna nigra ornata, elytrorum vittis in sutura conjunctis et versus latera minus extensis. Long., $3\frac{1}{2}$ l. ; lat., $1\frac{3}{5}$ l.

I do not know of any previously described species resembling this in coloring. The var. ? *maculatifrons* does not seem to differ from the type except in respect of its markings and in the sculpture of its head scarcely rugulose.

N.S. Wales ; sent to me by Mr. Masters from the Richmond River District ; the var. ? is from Queensland.

SOLENIA.

S. Cowleyi, sp. nov. Late ovata ; nitida ; supra testacea, elytris cœruleis ; subtus antice (capite prosternoque) testacea, postice (abdomine) picea, mesosterno et metasterno testaceis plus minusve infuscatis ; antennis piceis (articulis basalibus 3 testaceis) ; pedibus testaceis, posticis cum tibiis tarsisque omnibus plus minusve picescentibus ; capite lato lævi ; antennis quam corporis dimidium sat longioribus, articulo 3° quam 2us sesquilongiori ; prothorace convexo, quam longiori vix duplo latiori, vix manifeste punctulato, lateribus rotundatis, angulis anticis subdentiformibus, ad basin utrinque fovea impresso ; elytris sat crebre minus subtiliter (puncturis in parte antica subseriatim dispositis, in parte postica sat obsoletis) punctulatis. Long., $2\frac{1}{5}$—$2\frac{4}{5}$ l. ; lat., $1\frac{1}{5}$—$1\frac{3}{5}$ l.

This genus has not, I believe, been previously reported as Australian. The above species is no doubt very near *S. Albertisi*, Jac., but differs from it in several characters—*e.g.*, its yellow scutellum and the well defined and comparatively strong puncturation of its elytra.

N. Queensland ; taken by Mr. Cowley near Cairns.

MICRANTIPHA (gen. nov. *Galerucitarum*).

Caput convexum, inter oculos transversim sulcatum ; palporum maxillarium articulus apicalis brevis conicus acuminatus ; oculi sat parvi sat fortiter granulati ; antennæ robustæ sat elongatæ (articulo basali sat elongato, 2° 3° que inter se sat æqualibus minus brevibus, 4° quam 3us parum longiori) ; prothorax transversus, mox ante basin transversim sulcatus ; scutellum parvum ; elytra oblonga ; epipleuræ fere ad apicem continuæ ; prosternum inter coxas continuum ; metasternum sat elongatum, antice haud productum ; coxæ anticæ clausæ ; pedes sat robusti, tibiis sat cylindricis posticis breviter mucronatis ; tarsi breves, articulo basali (? maris solum)

dilatato—posticorum articulo basali quam 2us vix longiori; unguiculi appendiculati.

The minute insect for which I propose this name has much the appearance of a *Halticid*, but as its hind femora are not at all more dilated than than those of the other pairs of legs it must be placed among the *Galerucides*. It does not satisfactorily fall into any of Dr. Chapuis' "Groupes" of that sub-family, but its non-contiguous closed front coxæ together with its normal metasternum seem to associate it with the *Antiphites* from which however the presence of a small mucro at the extremity of the hind tibiæ (I cannot detect any mucro on the other tibiæ) seems to separate it. On the whole it has something of the facies of *Solenia* in miniature and therefore I think will not be far out of place if treated as an aberrant member of the *Antiphites*, but it is certainly a very puzzling form.

M. paradoxa, sp. nov. Oblongo-ovalis; sat nitida; setis gracilibus albis erectis sparsim vestita; brunneo-testacea vel brunnea, antennis apicem versus et abdomine magis obscuris; capite vix perspicue, prothorace sparsim fortius, punctulatis; elytris vix striatis, striis sat fortiter nec crebre punctulatis. Long., $\frac{3}{5}$—$\frac{4}{5}$ l.; lat., $\frac{1}{4}$—$\frac{3}{10}$ l.

One of my examples is smaller and considerably darker in color than the others, with antennæ a little longer (about as long as three-quarters of the body). I take its differences to be sexual, but it may possibly represent a distinct species.

S. Australia; Eyre's Peninsula.

CANDEZEA.

C. sculpta, Blackb. When I described this species (P. L. S., N.S.W. 1890, p. 363) I mentioned its very close alliance with *C. bimaculata*, Jac. and stated that I should have hesitated to consider it distinct except on the ground that *bimaculata* was said to have elytra scarcely visibly punctured. I have since obtained a specimen from New Guinea (the habitat of *C. bimaculata*) evidently conspecific with my *C. sculpta* and therefore—although I certainly cannot regard the elytra as "scarcely visibly punctured," I think there cannot be much doubt that the two names apply to the same insect and that *sculpta* must be treated as a synonym of *bimaculata*.

MENIPPUS.

Through the liberality of Mr. Masters I have recently acquired an authentic specimen of *M. cynicus*, Clk. (the typical species of this genus). It seems to have been an oversight that M. Lacordaire placed it in the Groupe *Galerucites* as its metasternum is strongly produced between the middle coxæ—a character that

refers it to M. Lacordaire's Groupe *Hylaspites*. Had I been able to examine a type previously, or had this character been recorded by the author of the genus or by M. Lacordaire, I should not have referred to *Menippus* the species which I have so referred, and I now regret to find that they cannot stand as congeneric with *M. cynicus*. They are three in number. The first of them *(M. maculicollis)* is I now believe a var. of *Dircema (Galeruca) australis*, Bohem, while the other two *(M. elegans* and *4-notatus)* may be referred to *Adimonia*, although *M. elegans* is by no means a typical *Adimonia* (approaching *Buphonida* in its head being scarcely narrower than its prothorax but differing from *Buphonida* even more than from *Adimonia* in its claws being scarcely bifid, almost simple).

MONOLEPTA.

There is no genus of the *Galerucides* more difficult to characterise definitely than this. Mr. Baly (Journ. Linn. Soc. XX.) states that it varies in respect of the closure of the front coxæ and in the length of the elytral epipleuræ, while Dr. Chapuis says that some of its species (having their front coxæ open) ought not to remain in it and Mr. Jacoby tells us that those with elongate elytral epipleuræ (in spite of Mr. Baly's statement that the type of the genus is one of these) ought to be removed. Among the numerous species (attributed to the genus) before me I find considerable variation in the elytral epipleuræ, but I have not seen any in which I can find that the front coxæ are open. These discrepancies of diagnosis occasion me considerable difficulty in respect of several new species before me, especially in view of the fact (referred to above) that Dr. Chapuis and Mr. Baly do not seem to mean quite the same by "open" or "closed" front coxæ. It seems best, under the circumstances to define the characters which in this memoir I regard as those of *Monolepta*, viz., front coxæ closed in the sense that the apex of the prosternal epimera is not (as it is in *e.g.*, *Luperus*) a free projection laid against the surface of the coxa, elytral epipleuræ failing (or at least only very obscurely traceable) behind the middle of the elytra, tibiæ mucronate ; basal joint of hind tarsi at least as long as the following joints together, claws appendiculate.

It is extremely difficult, in my experience, to draw a sharp line of distinction between the Groupes *Monoleptites* and *Luperites*. In some of the species that I have attributed to *Monolepta* (*M. modesta*, *quæsita*, and *Benallæ* particularly) the closure of the front coxæ is excessively fine and it is possible that they are examples of what Dr. Baly considers species with the coxæ not quite closed but nevertheless attributable to *Monolepta*. All

their tibiæ being mucronate and their elytral epipleuræ obsolete behind the middle I do not see how they can be placed in *Luperus* and the basal joint of their hind tarsi is too short for *Luperodes*, so for the present at any rate they must remain in *Monolepta*.

M. dilutior, sp. nov. Elongato-ovalis; sat nitida; pallide testacea, antennis apicem versus infuscatis, elytris apicem versus plus minusve obscuris: antennis gracilibus quam corpus parum brevioribus, articulo basali sat elongato arcuato, 2° 3° que brevibus (hoc quam ille graciliori), 4° sat elongato (quam 2us 3us que conjuncti vix longiori, quam 1us subbreviori); capite sublævi, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori duabus partibus latiori, subquadrato, sat fortiter vix crebre punctulato, transversim late minus profunde in medio impresso; elytris fere ut prothorax punctulatis; tarsorum posticorum articulo basali quam ceteri conjuncti fere duplo longiori. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

Var. elytris totis testaceis.

This little species has a more slender and fragile appearance than most *Monolepteæ* and has much the facies of a *Halticid*: the tarsi of its hind legs are nearly as long as their tibiæ. The elytral epipleuræ are broad near the base and rapidly become extremely narrow before the middle of their length, but are just traceable for an appreciable distance behind the middle. The dark blotch near the apex of the elytra looks as though it were caused by the elytra being sprinkled with a fine smoky dust, and is never very conspicuous.

N. Queensland; taken by Mr. Koebele near Cairns.

M. implicata, sp. nov. Elongato-ovalis; sat nitida; testacea, antennis apicem versus infuscatis, capite prothorace elytris que lineis maculisque piceis numerosis ornatis; antennis gracilibus quam corpus vix brevioribus, articulo basali sat elongato arcuato, 2° brevi, 3° quam 2us graciliori et dimidia parte longiori, 4° sat elongato quam præcedentes 2 conjuncti vix (quam 1us sat manifeste) breviori; capite sublævi, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori duabus partibus latiori, fortiter vix crebre punctulato, transversim obsolete impresso, lateribus modice arcuatis; elytris ut prothorax punctulatis; tarsorum posticorum articulo basali quam ceteri conjuncti fere duplo longiori. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

This species is closely allied to the preceding, though at once distinguishable from it by the markings on its upper surface (also by the more rounded sides of its prothorax, &c.). The piceous markings are a little variable. In an ordinary example

they consist of a longitudinal median line on the head ; a patch resembling the letter M on the prothorax and also the extreme lateral margins of the same ; and on each elytron a spot near the apex of the scutellum, a short longitudinal line between the spot and the shoulder, a bisinuate longitudinal line from the shoulder nearly to the middle of the elytron, a transverse zigzag line touching neither suture nor lateral margin slightly in front of the middle of the elytron, and two spots near the apex. In some examples these markings are larger and more numerous as well as nearly black in color. In one example (which the discovery of more specimens may possibly prove to be a distinct species as the prothorax seems more feebly punctulate and its transverse impression is scarcely traceable) the markings are black and those on the elytra present the appearance of three coarse vittæ (the inner two vittæ three or four times interrupted, the external one interrupted only near the base, all of them dilated here and there so as to coalesce in places) and the prothoracic discal markings consist of black lines touching the apex but not the base. I think this form might be called "var *extrema*" as I have not seen any specimen really intermediate between it and the type ; nevertheless I think its markings are only an extreme development of those of the type.

N. Queensland ; taken by Mr. Koebele near Cairns.

M. fumaticornis, sp. nov. Sat late ovalis ; sat nitida ; testacea, antennis nigris ; antennis minus gracilibus, quam corporis dimidium sat longioribus, articulo basali modice elongato, 2° 3° que brevibus inter se sat æqualibus, 4° elongato (quam præcedentes 2, et quam 1us sublongiori) ; capite sublævi, inter oculos transversim arcuatim profunde sulcato ; prothorace quam longiori dimidia parte latiori, sat crebre sat subtiliter punctulato, transversim sat fortiter impresso ; elytris crebre subfortiter punctulatis ; epipleuris paullo ultra medium sat distinctis ; tarsorum posticorum articulo basali quam ceteri conjuncti sesquilongiori. Long., $2\frac{1}{5}$ l. ; lat., $1\frac{1}{5}$ l.

Very distinct by its color, uniformly pale testaceous, except the antennæ which are entirely deep black.

Thursday Island ; taken by Captain E. Bourke, R.N.

M. sparsipennis, sp. nov. Sat late ovalis ; nitida ; flavo-testacea, antennis (articulis basalibus 3 exceptis) et elytrorum maculis singulis parvis basalibus, nigris ; antennis sat robustis, quam corpus sat brevioribus, articulo basali modice elongato, 2° minus brevi, 3° quam 2us paullo longiori, 4° quam 1us (et quam 2us 3us que conjuncti) vix longiori ; capite inter oculos transversim profunde arcuatim sulcato, parte postica

cum prothorace minus crebre sat subtiliter punctulata ; hoc quam longiori fere duplo latiori, transversim obsolete impresso ; elytris minus crebre minus fortiter punctulatis, epipleuris pone medium obsoletis ; tarsorum posticorum articulo basali quam ceteri conjuncti fere duplo longiori. Long., $2\frac{1}{5}$ l. ; lat., $1\frac{2}{5}$ l.

A very nitid species and easily recognisable from all known to me by its color and markings ; it is of a bright testaceous color, with the antennæ black (except the basal three joints) and a small black spot on either side of the scutellum. In the unique type the suture bears a small infuscate blotch a little in front of the middle, but as this mark is on one elytron only I suspect it is accidental.

N. Queensland : taken by Mr. Cowley near Cairns.

M. elytrura, sp. nov. Sat late ovalis ; nitida ; testacea, antennarum articulo apicali piceo, elytris rufo-piceis latera versus dilutioribus ; antennis modice gracilibus, quam corporis dimidium sat longioribus, articulo basali sat elongato, 2° brevi, 3° quam 2us sat longiori, 4° quam 1us vix breviori (quam 2us 3us que conjuncti vix longiori ; capite inter oculos transversim profunde arcuatim sulcato, vix manifeste punctulato ; prothorace quam longiori duplo latiori, sat æquali, crebrius sat subtiliter punctulato ; elytris minus confertim minus subtiliter punctulatis ; epipleuris pone medium obsoletis ; tarsorum posticorum articulo basali quam ceteri conjuncti duplo longiori. Long., $2\frac{1}{5}$ l. ; lat., $1\frac{1}{5}$ l.

Entirely testaceous except the apical joint of the antennæ which is blackish, and the elytra which are reddish piceous become more rufo-testaceous about the lateral and apical margins.

N. Queensland ; taken by Mr. Cowley near Cairns.

M. brevior, sp. nov. Subovata ; nitida ; brunneo-testacea, antennis (articulis basalibus 3 vel 4 exceptis) piceis, corpore subtus rufo-piceo abdomine excepto (hoc testaceo latera versus piceo) ; antennis gracilibus quam corpus paullo brevioribus, articulo basali sat elongato, 2° brevi, 3° quam 2us graciliori dimidia parte longiori, 4° quam 1us vix breviori (2° 3° que conjunctis longitudine sat æquali) ; capite sublævi, inter oculos transverse profunde arcuatim sulcato ; prothorace quam longiori dimidia parte latiori, sat æquali, fortiter (fere rugulose) punctulato ; elytris sat fortiter sat crebre punctulatis ; epipleuris ultra medium indistincte continuis ; tarsorum posticorum articulo basali quam ceteri conjuncti paullo longiori. Long., $1\frac{1}{5}$ l. ; lat., $\frac{3}{5}$ l.

The distinctly ovate form of this little species (its greatest width being behind the middle of the elytra) is characteristic. In

some respects it resembles *M. dilutior* structurally, but the comparatively much shorter basal joint of its hind tarsi forbids its being regarded as a very close ally.

N. Queensland; taken by Mr. Koebele.

M. cognata, sp. nov. Ovalis; modice elongata; nitida; testacea, antennis (basi excepta) leviter infuscatis; his sat robustis, quam corporis dimidium paullo longioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us manifeste longiori, 4° sat elongato quam 1us (et quam 2us 3us que conjuncti) sublongiori; capite subtiliter punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori dimidia parte latiori, transversim leviter impresso, subtilius punctulato; elytris subtiliter crebrius punctulatis; epipleuris paullo ultra medium continuis; tarsorum posticorum articulo basali quam ceteri conjuncti paullo longiori. Long., 2 l.; lat., $1\frac{1}{5}$ l.

This species bears much resemblance to *M. fumaticornis*, but is smaller, with the antennæ (the basal joint excepted) slightly infuscate and the elytra much more finely punctulate.

N. Queensland; taken by Mr. Koebele.

M. biguttigera, sp. nov. Elongato-ovalis; sat nitida; testacea, antennis (articulis basalibus 3 exceptis) infuscatis, elytris maculis nigris binis (sc. altera rotundata basali, altera elongata prope apicem oblique posita) ornatis; antennis modice robustis, quam corporis dimidium sat longioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us sat longiori, 4° quam 1us (et quam 2us 3us que conjuncti) vix longiori; capite vix manifeste punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori dimidia parte latiori, transversim minus fortiter impresso, sat crebre minus subtiliter punctulato; elytris fere ut prothorax punctulatis; epipleuris paullo ultra medium continuis; tarsorum posticorum articulo basali quam ceteri conjuncti paullo longiori. Long., 2 l.; lat., 1 l.

A very distinct species on account of the markings on its elytra, consisting of (on each elytron) a small roundish black spot on the base nearer the lateral margin than the suture and an elongate black spot placed obliquely near the apex (this also nearer the lateral margin than the suture).

N.W. Australia; sent to me by Mr. Masters.

M. variegata, sp. nov. Elongato-ovalis; sat nitida; testacea, antennis (articulis basalibus 3 exceptis) piceis, elytris plagis nigris (sc. macula lunata basali, macula mediana transversa, maculis 2 subapicalibus oblique positis, et margine apicali) ornatis, metasterno tarsisque infuscatis; antennis ut præced

entis; capite inter oculos distincte minus subtiliter punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori fere duplo latiori, transversim impresso, vix crebre minus subtiliter punctulato; elytris quam prothorax paullo magis crebre punctulatis; epipleuris vix ultra medium distincte continuis; tarsorum posticorum articulo basali quam ceteri conjuncti paullo longiori. Long., $1\frac{1}{5}$ l.; lat., $\frac{9}{10}$ l.

Structurally very near the preceding from which it differs widely in respect of its color and markings—also in several other respects, especially in the much more distinct puncturation of its head.

N.W. Australia; sent to me by Mr. Masters.

M. subsuturalis, sp. nov. Elongata; sat nitida; supra pallide brunneo-testacea, prothorace (nonnullorum exemplorum) indeterminate nigro-adumbrato, scutello nigro, elytrorum sutura angustissime nigra, antennis (articulis basalibus 3 fuscis exceptis) nigris; subtus nigra, pedibus testaceis (tarsis subinfuscatis); antennis (maris) quam corpus haud brevioribus sat robustis, (feminæ) brevioribus gracilioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us parum longiori, 4° modice elongato (1° et 2° 3° que conjunctis longitudine sat æquali); capite sat distincte punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori fere duplo latiori, transversim impresso, leviter minus distincte punctulato; elytris sat crebre subfortiter punctulatis; epipleuris pone medium obsoletis; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{1}{4}$ l.; lat., $\frac{1}{2}$ l.

This little species bears considerable resemblance to that which I take to be *suturalis*, Boisd., but differs from it *inter alia* by its black undersurface.

Victoria.

M. eyrensis, sp. nov. Præcedenti *(M. subsuturali)* valde affinis; differt antennis totis brunneo-testaceis, prothorace distincte punctulato, oculis magis grosse granulatis, elytrorum sutura leviter infuscata nec nigra. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l.

Very close to the preceding, but certainly distinct on account of the much coarser granulation of its eyes.

S. Australia; Eyre's Peninsula.

M. tricolor, sp. nov. Elongato-ovalis; sat nitida; testacea, capite prothoraceque rufis, antennis (articulis basilibus 4 exceptis) et elytrorum sutura (hac sat late) nigris, tarsis plus minusve infuscatis; antennis quam corpus sat brevioribus, articulo basali modice elongato, 2° minus brevi, 3° quam

2us parum longiori, 4° minus elongato (quam 1us, et quam 2us 3us que conjuncti, paullo breviori); capite sat fortiter punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori dimidia parte latiori, transversim vix impresso, sat crebre sat fortiter subrugulose punctulato; elytris sat crebre sat fortiter nec rugulose punctulatis; epipleuris paullo ultra medium sat distinctis; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., 1$\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

This species bears much superficial resemblance to *M. Froggatti*, Blackb., but, besides color differences, is very distinct from it *inter alia* by its strongly punctulate head and prothorax.

Victoria.

M. sordidula, sp. nov. Ovalis; sat nitida; sordide testacea, antennis (articulis basalibus 3 exceptis) infuscatis; his sat gracilibus, quam corpus sat brevioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us sat longiori, 4° minus elongato (quam 1us et quam 2us 3us que conjuncti subbreviori; capite subtilissime punctulato, inter oculos transversim sulcato et sub-bituberculato; prothorace quam longiori dimidia parte latiori, transversim vix manifeste impresso, distincte sat crebre punctulato; elytris crebre subfortiter punctulatis; epipleuris vix ad medium distinctis; tarsorum posticorum articulo basali ceteris conjunctis longitudine æquali. Long., 1$\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l (vix).

Resembles *M. inconspicua*, Blackb. from which however it differs *inter alia* by the puncturation of its prothorax.

Victoria; on the Black Spur and in other localities.

M. intertincta, sp. nov. Elongato-ovalis; sat nitida; testacea, antennis (articulis basalibus 5 exceptis) nigricantibus, sutura (hac peranguste) corporeque subtus nigris; antennis modice robustis, quam corporis dimidium sat longioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us manifeste longiori, 4° sat elongato (1°, et 2° 3° que conjunctis, longitudine sat æquali); capite distincte punctulato, inter oculos transversim profunde arcuatim sulcato (exempti typici in fronte transversim 3-foveolato); prothorace quam longiori fere duplo latiori, transversim fortiter impresso, sublævi; elytris subfortiter sat crebre punctulatis; epipleuris vix ultra medium distinctis; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., 1$\frac{2}{5}$ l.; lat., $\frac{2}{5}$ l.

Much resembles *M. subsuturalis* (of which it is possibly a well-marked local form) but differs from that species in its considerably larger size, in the basal five joints of its antennæ testaceous, its less infuscate tarsi, &c.

Victoria.

M. melancholica, sp. nov. Ovalis, minus elongata ; sat nitida ; piceo-nigra, capite prothorace que obscure rubrescentibus, pedibus piceo-testaceis (tarsis obscurioribus) ; antennis minus robustis, quam corpus parum brevioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us paullo longiori, 4° modice elongato (1° et 2° 3° que conjunctis, longitudine sat æquali) ; capite minus perspicue punctulato, inter oculos transversim profunde arcuatim sulcato et distincte bituberculato ; prothorace quam longiori duplo latiori, transversim vix perspicue impresso, leviter punctulato ; elytris subtiliter minus perspicue punctulatis ; epipleuris paullo ultra medium sat distinctis ; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{1}{5}$ l. ; lat., $\frac{2}{5}$ l.

Easily recognisable by its small size, dark color, and the fine inconspicuous puncturation of its very nitid elytra.

Victoria ; Alpine region.

M. ordinaria, sp. nov. Ovalis, modice elongata ; sat nitida ; nigra, capite prothorace que flavo-testaceis, antennarum tibiarumque basi plus minusve rufescentibus ; antennis sat robustis, quam corporis dimidium multo (maris) vel vix multo (feminæ) longioribus, articulo basali modice elongato, 2° sat brevi, 3° quam 2us (maris manifeste, feminæ vix) longiori, 4° longitudine 1° sat æquali (quam 2us 3us que conjuncti subbreviori) ; capite obsolete punctulato, inter oculos transversim profunde arcuatim sulcato ; prothorace quam longiori dimidia parte latiori, transversim vix manifeste impresso, subtilissime sparsius punctulato ; elytris subtiliter minus perspicue punctulatis ; epipleuris pone medium obsoletis ; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{4}{5}$ l. ; lat., $\frac{9}{10}$ l.

N.S.W.; on the Blue Mountains.

M. pictifrons, sp. nov. Elongato-ovalis, subparallela ; sat nitida ; nigra, capite supra (fronte summa labroque nigris exceptis) prothorace supra antennarum basi pedibusque testaceis ; antennis quam corporis dimidium multo longioribus, articulo basali modice elongato, 2° brevi, 3° quam 2us manifeste longiori, 4° modice elongato (quam 1us vix longiori, quam 2us 3us que conjuncti subbreviori) ; capite vix perspicue punctulato, inter oculos transversim profunde arcuatim sulcato ; prothorace quam longiori fere duplo latiori, transversim manifeste impresso, sat distincte punctulato ; elytris crebre fortius (fere subrugulose) punctulatis ; epipleuris pone medium obsoletis ; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{2}{5}$ l.; lat., $\frac{1}{2}$ l.

Easily distinguishable by the coloring of its face,—the labrum

and the part behind the transverse sulcus being black while the intermediate portion is yellow. Its nearest previously described ally seems to be *M. modesta*, Blackb.

Victoria.

M. piticollis, sp. nov. Ovalis, modice elongata; sat nitida; testacea, macula frontali maculis in prothorace 2 magnis et elytris (macula magna communi testacea excepta) fuscis vel nigro-fuscis, antennis (basi excepta) plus minusve infuscatis; his quam corpus paullo brevioribus modice robustis, articulo basali modico, 2° brevi, 3° quam 2us sat longiori, 4° modico (1°, et 2° 3° que conjunctis, longitudine sat æquali); capite vix perspicue punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori plus quam dimidia parte latiori, transversim vix impresso, subtiliter minus perspicue punctulato: elytris leviter minus perspicue punctulatis; epipleuris pone medium obsoletis; tarsorum posticorum articulo basali quam ceteri conjuncti manifeste longiori. Long., 2 l.; lat., 1 l. (vix).

Readily recognisable by the dark blotch on the middle of the forehead together with another somewhat similar (but larger) on either side of the median line of the prothorax and close to its front margin. The common testaceous area on the elytra seems variable in size and shape,—in some examples being nearly a parallelogram and occupying the larger portion of the elytra, in other examples being considerably smaller and having its shape modified by the dark basal and apical coloring being more or less prolonged along the suture (I have not seen any example in which the suture is wholly dark so as to divide the testaceous spot).

Victoria.

M. debilis, sp. nov. Ovalis, minus elongata; nitida; sordide rufo-testacea, antennis (articulis basalibus 4 exceptis) tibiis tarsis pectoreque infuscatis, abdomine fere nigro; antennis minus robustis quam corporis dimidium paullo longioribus, articulo basali sat elongato, 2° brevi, 3° quam 2us sesquilongiori, 4° sat elongato (1°, et 2° 3° que conjunctis, longitudiue sat æquali); capite fere lævi, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori duplo latiori, transversim vix perspicue impresso, sparsius sat subtiliter punctulato; elytris subtiliter sat sparsim (quam prothorax paullo magis subtiliter magis sparsim) punctulatis; epipleuris pone medium obsoletis; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

A species of inconspicuous appearance, differently colored from

its allies, and with the puncturation of its elytra unusually fine and sparse.

Victoria.

M. albotincta, sp. nov. Ovalis, minus elongata; nitida; nigro-picea, tibiis tarsisque dilutioribus, elytrorum lateribus albidis; antennis quam corporis dimidium paullo longioribus, minus robustis, articulo basali sat elongato, 2° brevi, 3° quam 2us sesquilongiori, 4° sat elongato (1°, et 2° 3° que conjunctis, longitudine sat æquali); capite vix perspicue punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori duplo latiori, transversim vix impresso, fortius sat crebre punctulato; elytris ut prothorax punctulatis; epipleuris pone medium obsoletis; tarsorum posticorum articulo basali quam ceteri conjuncti vix longiori. Long., $1\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

Apart from other characters the coloring of this species is so distinctive that it is impossible to confuse it with any of its described allies.

Victoria.

M. (?) tarsalis, sp. nov. Oblongo-ovalis; sat nitida; supra sordide testacea hic illic indeterminate infuscata, antennis nigris, pectore abdomineque nigris, pedibus testaceis; antennis robustis, quam corpus paullo brevioribus, articulo basali minus elongato, 2° sat brevi, 3° quam 2us parum longiori, 4° sat elongato (quam 1us et quam 2us 3us que conjuncti sublongiori); capite sat magno (quam prothorax haud multo angustiori), distincte punctulato, inter oculos transversim profunde arcuatim sulcato; prothorace quam longiori dimidia parte latiori, transversim obsolete impresso; subtiliter sat crebre punctulato; elytris crebre subtilius (quam prothorax paullo minus subtiliter) punctulatis; epipleuris pone medium obsoletis; tarsorum posticorum articulo basali (? maris solum) valde dilatato, quam ceteri conjuncti subbreviori. Long., $2\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

I feel much hesitation in attributing this species to *Monolepta* on account of the remarkable dilatation of the basal joint of its hind tarsi, and also on account of that joint being not quite so long as the three following joints together. I cannot, however, find that any other genus has been characterised to which this insect might be referred, and the tarsal character does not seem sufficient to justify the formation of a new genus.

S. Australia; near Quorn.

M. croceicollis, Germ. I have not seen any *Galerucid* agreeing with the description of this species, but it does not seem at all likely to be a true *Monolepta* as its author states that the third joint of its antennæ is as long as the fourth.

The described Australian species of *Monolepta* are now so numerous that it seems desirable to attempt a tabular statement of their characters. In the following table I have been obliged to rely more upon distinctions of color and markings than I altogether like doing, but this is due to the fact that a good many species probably attributable to *Monolepta* were described by the earlier authors in terms which gave no information regarding them except in respect of their colors and markings and it seems desirable to include these in a tabular arrangement although there are only two or three of them that I have been able to identify as among the species before me. I do not think that this is a very important matter, however, as I find that few species of *Monolepta* vary too much to be confidently separated by such broad distinctions of color and marking as I have made use of.

A. Elytra with sharply defined markings.
  B. The elytral markings transverse.
    C. Base and apex of elytra not concolorous.
      D. Elytra red in front, dark behind.
        E. Abdomen fulvous ... ... *dimidiata*, Jac.
        EE. Abdomen black ... ... *divisa*, Blackb.
      DD. Elytra dark in front, red behind ... *hæmorrhoidalis*, Fab.
    CC. Base (at least in its scutellar region) and apex of elytra concolorous.
      D. The base and apex entirely black.
        E. An entire median pale fascia ... *fasciatipennis*, Blackb.
        EE. The pale facia not reaching the lateral margins ... ... *picticollis*, Blackb.
      DD. Base black around the scutellum, red laterally ; apex black.
        E. The basal red of the elytra is an isolated spot ... ... *angulata*, Blackb.
        EE. The basal red of the elytra is widely connected with the median red portion ... ... *alpina*, Blackb.
  BB. The elytral markings longitudinal.
    C. The marking consists in the suture being black.
      D. Puncturation of prothorax indistinct or at least very feebly impressed.
        E. Underside black.
          F. Species of normal form.
            G. Hinder part of head black ... *Froggatti*, Blackb.
            GG. Head entirely testaceous ... *intertincta*, Blackb.
          FF. Form very narrow and subparallel *subsuturalis*, Blackb.
        EE. Underside testaceous ... ... *suturalis*, Boisd.
      DD. Prothorax very strongly and conspicuously punctured ... ... *tricolor*, Blackb.
    CC. The markings consist of a discal dark vitta on each elytron ... ... *Tepperi*, Blackb.
    CCC. The markings consist of a whiteish marginal vitta on each elytron ... *albotincta*, Blackb
  BBB. The elytral markings consist of isolated spots.

C. Apex of elytra black.
D. Elytra pallid, with a basal and apical spot black ... ... *quadrimaculata*, Jac.
DD. Elytra black, with a pale humeral spot ... ... *humeralis*, Fab.
DDD. Three or four large isolated dark spots on each elytron ... ... *variegata*, Blackb.
CC. Apex of elytra pallid.
D. Underside testaceous.
E. Two black spots on each elytron (Form elongate)... ... ... *biguttigera*, Blackb.
EE. One black spot (basal) on each elytron (Form normal) .. ... *sparsipennis*, Blackb.
DD. Underside black ... ... *quadripunctata*, Fab.
BBBB. Elytral markings different from the preceding.
C. Elytra pallid, with a number of fine zig-zag dark lines ... . *implicata*, Blackb.
CC. Elytra testaceous, with a rose-colored basal patch and subapical spot ... *rosea*, Blackb.
AA. Elytra without sharply defined markings.
B. Elytra dark (*i.e.*, green blue or blackish).
C. Head black.
D. Prothorax testaceous or red.
E. Antennæ entirely black ... ... *nigricornis*, Blackb.
EE. Base of antennæ testaceous.
F. Size small (length less than 2 l.), surface nitid ... ... *modestus*, Blackb.
FF. Size larger (length more than 2 l.), surface subopaque ... ... *Meyricki*, Blackb.
DD. Prothorax black or bluish.
E. Apical joints of antennæ fulvous ... *Germari*, Jac.
EE. Apical joints of antennæ dark ... *quæsita*, Blackb.
CC. Head partly testaceous.
D. Legs testaceous.
E. Size small (length about 1½ l.) (Form narrow) ... ... *pictifrons*, Blackb.
EE. Size larger (length more than 2 l.) (Form normal) ... ... *occidentalis*, Blackb.
DD. Legs black ... ... *Benallæ*, Blackb.
CCC. Head entirely rufous or testaceous.
D. Scutellum dark.
E. Size very small (length less than 1½ l.), elytra dark piceous ... *melancholica*, Blackb.
EE. Size larger (length about 2 l.), elytra deep black ... ... *ordinaria*, Blackb.
DD. Scutellum yellow ... ... *lebiæformis*, Boisd.
BB. Elytra testaceous, or reddish, or brownish-testaceous.
C. Basal joint of hind tarsi less than half again as long as the rest together.
D. Basal joint of hind tarsi of normal form.
E. Upper surface more or less mottled or clouded with a darker tone of color.
F. Elytra considerably more closely and conspicuously punctured than disc of prothorax.

G. Form very elongate. Elytral puncturation (for a *Monolepta*) very strong ... ... *eyrensis*, Blackb.
GG. Form normal. Elytral puncturation considerably less strong.
H. Antennæ (at least of one sex) long robust and (except basal three joints) black ... *simulatrix*, Blackb.
HH. Neither sex with antennæ as H. ... ... *inconspicua*, Blackb.
FF. Puncturation of prothorax and elytra uniform or nearly so.
G. This puncturation (for a *Monolepta*) very strong ... *sordidula*, Blackb.
GG. This puncturation very feeble *debilis*, Blackb.
EE. Upper surface uniformly bright testaceous, without infuscation ... *cognata*, Blackb.
DD. Basal joint of hind tarsi (at least in one sex) strongly dilated... ... *tarsalis*, Blackb.
CC. Basal joint of hind tarsi at least half again as long as the rest together.
D. Antennæ more or less testaceous.
E. Transverse discal impression of prothorax obsolete.
F. Antennæ (except piceous apical joint) wholly testaceous ... *elytrura*, Blackb.
FF. Antennæ (except at base) infuscate ... ... *brevior*, Blackb.
EE. Transverse discal impression of prothorax well defined ... ... *dilutior*, Blackb.
DD. Antennæ entirely deep black ... *fumaticornis*, Blackb.

CASSIDIDES.

CHIRIDA.

This genus was founded by Dr. Chapuis (Gen. Col. xi. 405) for certain species attributed by Boheman to *Coptocycla* and which differ from *Coptocycla* in their claws being appendiculate instead of simple. Dr. Chapuis says that owing to the slight regard Boheman paid to the structure of the claws in his descriptions of *Cassididæ* it is impossible to specify accurately which of his *Coptocyclæ* should enter this new genus ; the only species he (Dr. Chapuis) can answer for as members of *Chirida* are two from S. America. The following species from tropical Queensland agree sufficiently with Dr. Chapuis' diagnosis to be at any rate provisionally placed in *Chirida*, although it is quite possible that if they could be compared with the American species on which the genus was founded it might appear necessary to found another distinct genus for these Australian forms. It may be noted that one of the species described below is so near (judging by the description) to *Coptocycla Holmgreni*, Bohem. that although Boheman does not describe the claws of that insect it is almost

sure to be congeneric with the species before me, from which it seems a probable conclusion further that all the other Australian *Cassidides* described by Boheman as congeneric with *Holmgreni* must be eliminated from *Coptocycla*. The following characters in combination distinguish these insects from all the other known Australian *Cassidides* :—Head entirely hidden under the front of the prothorax ; claws appendiculate, the basal piece not being pectinate ; prothorax much narrower than the elytra. The two species described below differ *inter se* so much in size and facies as well as in some structural characters that they might well be treated as generically distinct from each other, but in view of the large number of Australian *Cassidides* still remaining undescribed it is better I think for the present to be content with describing *species* and grouping them in genera by a few well-marked characters, as generic classification should be based if possible on plentiful supplies of material. The characters I have mentioned above associate these two together and distinguish them from all other genera that have been attributed to Australia.

C. multicolor, sp. nov. Subrotundata ; nitida ; valde convexa ; pallide testacea ; supra (marginibus explanatis exceptis) nigro-picea, rufo-ferrugineo-variegata ; antennis fere ad coxas posticas attingentibus, subfiliformibus, articulis 3°—5° inter se sat æqualibus (quam 1us gracilioribus paullo brevioribus, quam 2us gracilioribus sat longioribus) ; prothorace transverso, fere æqualiter elliptico, fere lævi ; elytris leviter interrupte striatis, striis grosse punctulatis, antice retusis, pone scutellum vix distincte gibbis, humeris callosis ; tarsorum articulo apicali ultra præcedentem vix excedenti ; corpore subtus fere lævi. Long., 3 l. ; lat., $2\frac{1}{2}$ l.

The markings of the convex discal portion of the upper surface are as follows :—On the prothorax this portion is ferruginous with a short broad blackish vitta running forward a short distance from the base and dilating at its front ; on the elytra the discal part is blackish with the following parts ferruginous—the scutellum and a spot on either side of it, on each elytron a little behind the scutellum a V-shaped mark having its apex on the suture, on each elytron behind the middle a subsutural spot, also the lateral and apical edges of the discal part (this edging being dilated inward about the middle and near the apex). The ferruginous parts are slightly raised and are probably metallic when the insect is alive. The explanate margin is wide and sloped downward ; at its widest part it is considerably narrower than the interval between it and the suture. The prothorax is almost exactly of the figure that is known in mathematics as a section of an elliptic spindle and is

sunk between the prominent and somewhat acute humeral angles of the elytra to its lateral angles which are obtuse. This species is probably near *Coptocycla Holmgreni*, Bohem., but I judge from the description of that insect that *inter alia* it differs much from the present one in color and marking.

N. Queensland ; taken near Cairns by Mr. Cowley ; also sent to me by Mr. Masters.

C. maxima, sp. nov. Scutiformis ; nitida ; valde convexa ; pallide testacea, antennarum parte apicali nigra, elytrorum parte discoidali rufescenti nigro-variegata ; antennis fere ad coxas posticas attingentibus, parte dimidia apicali quam basalis nonnihil robustiori, articulo 3° quam 2us vix longiori, 4° quam 3us fere duplo longiori, 5° quam 4us (et 6° quam 5us) sat breviori, 6°—10° inter se sat æqualibus, 11° quam 10us sat longiori ; prothorace transverso sublævi, angulis lateralibus subacutis ; elytris hic illic striis brevibus punctulatis impressis (in aliis partibus fere lævibus), pone scutellum alte gibbis, humeris leviter callosis ; angulis humeralibus rotundatis fortiter (sc. ultra prothoracis angulos laterales) productis ; tarsorum articulo apicali ultra præcedentem manifeste excedenti ; corpore subtus fere lævi. Long., 6 l. ; lat., 5 l.

The markings on the convex discal portion of the elytra are as follows :—On the retuse portion in front some inconspicuous blackish clouds, a linear interrupted blackish marking or series of marks running obliquely from the humeral callus to the suture at about its middle, an irregular blotch of blackish color near the apex of the suture which is obsoletely continued along the suture to its actual apex (on the explanate border). The form of the prothorax is peculiar ; at either extremity of the front (evenly curved) outline (which represents I suppose the front and lateral margins) the outline is sharply rectangular ; from this angle the prothorax narrows strongly hindward, its outline on either side being nearly an oblique straight line ; this straight line at its hind extremity merges without a defined angle into the sinuate horizontal base which in the middle is moderately lobed hindward. The gibbosity behind the scutellum (in reality it includes the scutellum) is very pronounced (amounting to a large conical protuberance), the front slope of which bears a large deep fovea on each elytron. The explanate margin of the elytra is very wide, being at its widest part scarcely narrower than the interval between its inner margin and the suture. The fourth joint of the antennæ distinctly longer than any other joint except the first and eleventh is a very distinctive character. The appendiculation of the claws is, even more markedly than in

the preceding species, of the peculiar form that Dr. Chapuis attributes to *Chirida*. That learned author says that the structure is not quite that which the term "appendiculated" indicates: but that the base of each claw is dilated in such fashion as to produce the appearance (if the two claws be looked at from in front of them) of their basal parts being connected by a kind of erect quadrate lamella. The front margin of the prothorax does not project far beyond the head; when the antennæ are projected forward the apex of the basal joint is visible from above.

N. Queensland; near Cairns.

C. (?) lacunata, sp. nov. Breviter late ovalis (vel potius subquadrata); nitida; sat convexa; supra rufo-ferruginea, margine explanato (prothoracis toto, elytrorum in medio solum) testaceo translucido; capite (parte antica nigra excepta) antennis (parte apicali vix infuscata) pedibusque testaceis; corpore subtus nigro (abdominis apice testaceo); antennis elongatis ad coxas posticas attingentibus, articulo 3° quam 2us graciliori et paullo longiori, 4° quam 3us sat longiori, 7°—11° clavam laxam minus dilatatam formantibus; prothorace fortiter transverso, sat æqualiter elliptico, lævi (puncturis nonnullis sat magnis ante basin positis exceptis); elytris pone scutellum haud gibbis, vix striatis, striis sat regulariter punctulatis (puncturis in striis sat parvis), humeris sat callosis, angulis humeralibus rotundatis minus productis; corpore subtus sparsim perspicue punctulato; tarsorum articulo apicali ultra præcedentem vix excedenti; unguiculis appendiculatis (in sensu solito). Long., 2½ l.; lat., 2 l.

The claws of this species are very difficult to examine without breaking them off as they scarcely project from the penultimate tarsal joint and are recurved in form so as to be closely applied to its under surface. They are divergent (*i.e.* having their dorsal border lying in the direction,—or nearly so,—of the longitudinal line of the tarsus) and are appendiculate in the ordinary sense of the term, the front claws being more markedly so than the others (perhaps in one sex only). This species is difficult to place in Dr. Chapuis' classification of the *Cassididæ*; the only subfamily characterised as having the head covered by the prothorax and also the claws appendiculate is the *Chiridites*,—but in its single genus *(Chirida)* the appendiculation of the claws is of the peculiar structure mentioned above (under *C. maxima)*, whereas in the present insect it is of ordinary structure. It would perhaps be justifiable on this ground to find a new generic name for this species, but for reasons mentioned above it seems at present desirable to avoid multiplications of genera for the Australian

species of this family ; at any rate under the condition in which I find myself of not having available for comparison a large collection of *Cassididæ* from all parts of the world.

As a *species* this insect is very easily recognisable. The red color of its elytra extending over the explanate margin (which is fairly wide, but at its widest considerably narrower than the interval between it and the suture) except on a conspicuous yellow transparent patch placed at about the middle of its length characterises it quite unmistakeably.

N. Queensland ; given to me by Mr. French.

C. simplaria, sp. nov. Subrotundata ; sat nitida ; sat convexa ; testacea, supra parte convexa discoidali indeterminate obscuriori ; antennis fere ad coxas posticas attingentibus, subfiliformibus, articulis 3°—5° inter se sat æqualibus (quam 1us gracilioribus vix brevioribus, quam 2us gracilioribus multo longioribus) ; prothorace transverso fere æqualiter elliptico, vix manifeste punctulato, parte discoidali a margine explanato sulculo interrupto curvato et 4-foveolato leviter impressa distincta ; elytris vix striatis irregulariter fortiter seriatim punctulatis, hic illic irregulariter (et longitudinaliter et transversim) areis leviter convexis instructis, pone scutellum haud gibbosis, humeris callosis ; tarsorum articulo apicali ultra præcedentem vix excedenti ; corpore subtus fere lævi. Long., $2\frac{1}{2}$ l. ; lat., $2\frac{1}{5}$ l.

An almost uniformly brownish testaceous insect, with the convex portion of the upper surface here and there more decidedly *brown* than the rest of the surface. Not quite so nitid as is the preceding *(C. multicolor)* and distinguishable also by the convex disc of the prothorax being separated from the explanate margin by an exceptionally distinct but much interrupted furrow in which there are four well marked large impressions. The shoulders of the elytra are rather strongly projected forward (reaching the middle of the prothorax), their front angles being obtuse. The more or less smooth (somewhat convex) spaces on the elytra are very ill defined and consist of two or three transverse and obliquely longitudinal patches placed in the neighborhood of the front half of the suture. The prothorax is very finely and closely but scarcely distinctly punctulate.

N. Queensland ; taken near Cairns by Mr. Cowley.

CASSIDA.

C. Adelaidæ, sp. nov. Ovalis ; sat nitida ; convexa ; rufo-brunnea, corpore subtus obscuriori, antennis apicem versus picescentibus ; his brevibus (vix ultra coxas intermedias attingentibus), articulo 3° quam 2us graciliori et sat longior ;

(4° sat æquali), articulis ultimis 5 clavam laxam formantibus (10° fere transverso quam 11us fere duplo breviori); prothorace quam longiori dimidia parte latiori, antice late rotundato, postice sat fortiter bisinuato, subtilissime coriaceo et sparsim vix perspicue punctulato; elytris punctulato striatis, puncturis in striis crebre positis sat magnis, interstitiis discoidalibus latis leviter convexis, humeris vix callosis, angulis humeralibus obtusis modice productis, marginibus punctulatis minus latis; corpore subtus sublævi. Long., $2\frac{2}{5}$ l.; lat., $1\frac{3}{5}$ l.

Distinguishable from *C. mera*, Germ., and *C. denticulata*, Bohem., *inter alia* by the non-denticulate sutural apex of its elytra, from *naricella*, Bohem., by its head and undersurface not being black, &c., and from *perpusilla*, Bohem., by its much larger size.

S. Australia.

C. prothoracica, sp. nov. Late breviter ovalis, postice angustata; sat nitida; sat convexa; brunneo-testacea, antennarum parte apicali elytris et corpore subtus plus minusve infuscatis; antennis fere ut præcedentis *(C. Adelaidæ)* sed clavæ articulis paullo magis elongatis; prothorace fere ut præcedentis sed antice multo magis anguste rotundato; elytris vix striatis, seriatim punctulatis, inter series interstitiis haud convexis, humeris leviter callosis, angulis humeralibus minus obtusis modice productis, marginibus vix distincte punctulatis minus latis; corpore subtus sublævi. Long., $1\frac{4}{5}$ l.; lat., $1\frac{3}{10}$ l.

Distinguishable at once from the previously described Australian species of the genus by its non-striate elytra, the rows of punctures being separated by flat interstices. The infuscation of the elytra is variable and ill-defined consisting of a few elongate blotches of which the most constant appear to be two placed obliquely one on either side of the scutellum.

N.S. Wales; taken by Mr. Sloane near Mulwala.

ASPIDOMORPHA.

A. planipennis, sp. nov. Rotundata; minus convexa; nitida; testacea; antennarum apice, elytris (maculis 3 magnis transversim positis exceptis, sc. 1 communi a basi ad mediam partem suturæ extensa et utrinque macula ovali in margine explanato paullo pone basin posita), nigris; elytris pone scutellum haud gibbis, vix (striis subsuturali et externa exceptis) postice obsoletis, callo humerali sat prominulo, angulis humeralibus obtusis, margine explanato quam discus nullo modo angustiori, disco medio paullo pone basin fovea profunda impresso.

Var. macula communi elytrorum nigromaculata, maculis lateralibus ad marginem extensa, et macula in margine explanato prope apicem addita. Long., 5 l.; lat., $4\frac{1}{5}$ l.

The notable character in this species is the great width of the explanate margins of its elytra which at their widest are fully as wide as the interval between the suture and the external stria. The insect is allied to *A. ramulopicta*, Wag., from which it differs *inter alia* by the character just cited, by the absence of a yellow spot in the front black part of the explanate margin, and by the elytra being without any gibbosity behind the scutellum and being much less evidently striate.

N. Queensland; taken by Mr. Cowley near Cairns; the var. taken by Mr. Masters.

A lauta, sp. nov. Rotundata; modice convexa; nitida; testacea; prothoracis elytrorumque disco plus minusve brunnescentibus; horum sutura (plus minusve manifeste) et notula subsemicirculari (hac ab angulo humerali introrsum curvata, in discum paullo extensa et marginem lateralem paullo ante apicem attingenti) ferrugineis; elytris pone scutellum fortiter gibbis, aliter ut præcedentis (*A. planipennis*). Long., $4\frac{2}{5}$ l.; lat., $3\frac{3}{5}$ l.

Owing to the colors of this species being all various shades of testaceous or reddish-testaceous they present a washed-out appearance which seems constant and characteristic. The only marking that is at all well-defined is a ferruginous curved mark on the elytra which commences at the humeral angle and curves inward (reaching about its middle just on to the discal side of the external stria) arriving at the lateral margin again a little before the apex. It is distinguished from most of its allies by the antennæ being constantly unicolorous. The explanate margin of the elytra (as in *A. planipennis*) is at its widest fully as wide as the interval between the suture and external stria.

N. Territory of S. Australia; near Port Darwin. A N. Guinea species (which I have been unable to identify) is near this one but has elytra almost impunctulate.

COCCINELLIDÆ.

RHIZOBIUS.

R. secessus, sp. nov. Breviter late ovalis; valde convexus; minus nitidus; pube albida suberecta et setis longioribus magis erectis vestitus; ferrugineus, metasterno piceo, antennis pedibusque rufo-ferrugineis; capite prothoraceque crebre subtiliter, elytris sat subtiliter (sed quam prothorax sat fortius) crebre, punctulatis; prosterno medio longitudinaliter

depresso, spatio depresso antice sat angustato utrinque subtiliter carinato. Long., $1\frac{1}{2}$ l. ; lat., $1\frac{1}{10}$ l.

In my tabulation of the species of *Rhizobius* (Tr. Roy. Soc., S.A., 1892 pp. 257 &c.) this species should be placed along with *R. discolor*, Er., and *Evansi*, Muls., from both of which it differs *inter alia* by the much finer puncturation of its elytra.

Victoria ; taken at the Hermitage, on the Dividing Range.

Notes on the Geology of the Ninety-Mile Desert.

By Edward Vincent Clark, B.Sc.

[Read April 14, 1896.]

Plate, I.

The geology of the area enclosed between the River Murray on the north and west, and the Victorian frontier on the east, is little known, with the exception of the more southerly portion, where the Eocene beds of the Mount Gambier District are found. The object of this paper is to bring into notice several Tertiary deposits occurring in or near the Ninety-Mile Desert.

The Mount Gambier beds are fairly well known, and have frequent outcrops from Kybybolite, where they have an altitude of about 300 feet, and Narracoorte, 270 feet, to MacDonnell Bay, where they pass below sea level, thus having a dip of about three feet per mile, as Kybybolite—according to the Rev. Tenison-Woods, the most northerly point in this district having an Eocene outcrop—is about 100 miles from the coast.

A well sunk at Bordertown by the Railway authorities revealed a polyzoal limestone some distance below the surface, and a short time ago I obtained several fossils from various wells, five or six miles south of Bordertown. The matrix of the bed is very similar to that of the Mount Gambier Eocene, being almost a pure limestone, composed mostly of broken pieces of polyzoa, with a few large fossils. This limestone forms the base of the wells, which are about 70 feet deep, but as, unluckily, I was not present at the digging of any well, I am unable to say how near to the surface these beds extend. As the Bordertown Railway Station is 268 feet above sea level, these beds have an altitude of about 200 feet, or perhaps more. According to the dip, above mentioned, of the Mount Gambier beds, they should have an altitude of about 400 feet, but although they may originally have had this altitude and have been worn down before the deposition of the present surface material, this is not likely. Still, considering the similarity in the lithological features of the bed here and further south, there is no reason to doubt the continuity of the Bordertown bed, and the Eocenes of Narracoorte and Mount Gambier.

The fossils found at Bordertown were not numerous, either as

regards species or specimens, but by searching the debris round various wells I obtained the following :—

Pecten polymorphoides, *Zittel*
Pecten Gambierensis, *Ten.-Woods*
Amussium Zitteli, *Hutton*
Waldheimia divaricata, *Tate*
Terebratella Woodsii, *Tate*
Terebratulina catinuliformis*, *Tate*
Magasella Woodsiana, *Tate*
Psammechinus Woodsii, *Laube*
Hemiaster planedeclivis, *Gregory*
Lovenia Forbesii, *Tenison-Woods*
Scutellina patella, *Tate.*

also numerous polyzoa, and the carapace of a crustacean.

With the exception of the *Pecten Gambierensis*, which is perhaps only a variety of *P. polymorphoides*, all the above-named species occur in the River Murray cliffs, while only five, namely *Pecten Gambierensis*, *Amussium Zittelli*, *Terebratulina catinuliformis*, *Magasella Woodsiana*, and *Scutellina patella* are to be found in any part of the Mount Gambier series, so we see here that while the character of the stone agrees with that of the Mount Gambier deposits, the fauna it contains has greater affinity with the beds of the Murray Cliffs.

By the kindness of Mr. J. W. Jones, the Conservator of Water (to whom my sincerest thanks are due for supplying me with material from various bores, and also for many suggestions concerning this paper), I acquired some fossils obtained at a depth of 200 feet from a well at Pinnaroo; and as the altitude of that place is only about 250 feet, these fossils were found not far above sea level. However, I saw no samples of stone from any other part of the well; and so these may easily have been found near the base of the Eocene deposits there. The fossils were mainly in the form of casts, with the exception of several palliobranchs, including *Waldheimia Garibaldiana*, *W. grandis*, and *Magasella compta.* Besides these there were recognisable, as far as casts ever can be determined, *Cucullæa Corioensis*, *Cassis exigua*, a *Conus*, and one or two *Cypræas.* This bed is clearly Murravian, both on lithological and on palæontological grounds, and so we have a connecting link between Bordertown on the south and the River Murray on the north, Pinnaroo being nearly midway between. In all probability bores put down north of Bordertown would reveal the polyzoal limestone of Mount

* Note.—This species is usually known as *T. Davidsoni.* As another species has this name the Australian shell has been re-named as above by Professor Tate.

Gambier, becoming more and more arenaceous, with a corresponding decrease of polyzoa and increase of the mollusca, till at Pinnaroo we get the almost typical Murravian bed. The chief objection to this view is that if the dip of three feet per mile, as shown between Narracoorte and Port MacDonnell, were continued northwards, the Murray Cliffs should be about 1,000 feet above sea level, excluding the Miocene covering; whereas the Eocenes of the Murray rarely reach an altitude of more than 200 feet. Still, this is not a very serious objection, as we saw that the beds at Bordertown are not nearly so high as they would be according to this dip, and so we might very reasonably consider that the beds further north ought to have very little dip at all, if any, or perhaps they may undulate to a small extent.

The country to the west of Bordertown, to the Murray, is practically a geological *terra incognita*. As the ground descends considerably from Bordertown along the line, so that at Wirrega, 13 miles away, the altitude is 210 feet; and at Keith, 15 miles further, only 101 feet, one might expect an outcrop of the polyzoal limestone to occur; but I have been unable to hear of any such outcrop,—and it is improbable that one could exist without being known,—so we may assume that there is none such. However, at Coonalpyn, Ki Ki, Tintinara, and Emu Flat bores have been put down by the Government; and the Conservator of Water, Mr. Jones, allowed me free access to the boxes of samples of stone obtained from them. Each bore meets Eocene strata at a moderate depth below sea-level, and of considerable thickness, while all four bores show great similarity in the beds through which they pass.

Ki Ki, the most westerly bore, is situated on the railway line about 105 miles from Adelaide, or nine miles west of Coonalpyn. The mouth of the bore is 68 feet above sea-level, and the total depth of the bore 666 feet.

For a depth of 145 feet, or to 77 feet below sea-level, unfossiliferous limestones are found. Then comes a bed of Eocene polyzoal limestone, having a thickness of 195 feet, but containing few fossils other than polyzoa. This bed is met with in each bore, and from it I have obtained *Terebratulina lenticularis*, *T. catinuliformis*, *Magasella sp.*, *Salenia tertiaria* (?), and *Scutellina patella*. Below this in each bore is found a black clay intercalated with fossiliferous sands.

In the Ki Ki bore these clays and sands alternate for 108 feet, or to a depth of 380 feet below sea level, when the bed rock is met with at first a light colored clay, becoming by degrees much harder till at the base of the bore, 600 feet below sea level, it becomes almost a slate.

The black clay is very noteworthy. It varies from a brownish

color, in some places containing a few bits of fossil shells, to an intense black, with no visible trace of fossil remains at all. It is usually highly carbonaceous, and in the Coonalpyn bore at one point actually becomes a lignite, which will burn if held in a flame, though like charcoal it does not give out sufficient heat to keep alight by itself. In each bore the first deposit below the polyzoal limestone is a band of this clay, but after that the different bores vary in their arrangement of the sand and clay.

This sand contains at Ki Ki numerous polyzoa and a goodly number of gastropods, with a few lamellibranchs, nearly all very small, and all showing signs of being greatly worn, proving the deposit to be littoral. Professor Tate gives the opinion that these shells more nearly resemble those of the Adelaide Eocene beds than those of any other deposit, though many of them appear to be new species. Here we see, as at Aldinga (which is pretty well identical with the Adelaide deposits) that the polyzoal limestone overlies the bed containing gastropods.

At Coonalpyn the bore is very similar, except that the altitude of the various beds differs a good deal.

The surface of the bore is 72 feet above sea level, and the unfossiliferous limestone has a thickness of 75 feet. Then come the polyzoal limestones, extending to a depth of 262 feet, *i.e.*, having a thickness of 259 feet. Next we have the intercalated sands and clays for 196 feet, the bed-rock being reached at a depth of 458 feet, while the bore descends 758 feet below sea-level. There is no great difference between the beds in this and in the Ki Ki bore, except that the sand beds here contain very few fossils except polyzoa, though careful searching reveals a few gastropods, among which is a *Turritella*, very like, if not identical with, *Turritella Aldingæ*. We see also that the sands and clays have a much greater thickness here than at Ki Ki, the difference, 88 feet, being mainly at the bottom, and due to the slope of the bed-rock.

The Tintinara bore is peculiar in that the unfossiliferous limestone overlying the Eocene in both other bores is here entirely absent, and in its stead we find a deposit of recent shells of a thickness of 154 feet, *i.e.*, extending to 92 feet below sea-level. Then the polyzoal limestone, instead of being 250 feet, as at Coonalpyn, is reduced to six feet, the black clay, which here is not so carbonaceous, being met with at a depth of 98 feet. The sands associated with this clay appear to be fairly fossiliferous, but the bore only reaches a depth of 191 feet (or to 253 feet from its mouth), and consequently the bore ends in Eocene beds.

Emu Flat is situated about five miles from the railway, Keith being about the nearest point. Here we find the Recent or Pleistocene beds of the Tintinara bore absent, but the unfossil-

iferous limestone of Coonalpyn and Ki Ki has reappeared. This deposit descends to 21 feet below sea-level. Then the polyzoal limestone succeeds for a thickness of 88 feet, and at 109 feet below sea-level the clays and sands begin, the latter in this bore containing very few fossils of any sort whatever. The bore only goes down 168feet below sea-level, and does not bottom the Eocenes.

The relative positions and depths of these four bores are shown on the accompanying horizontal section, together with a well-section at Bordertown, and the section of a bore situated four miles east of Wellington, the latter recorded by Prof. Tate. (Trans. Roy. Soc. vol. IV., p. 144). The mouth of the bore near Wellington is near sea-level, and for 56 feet are met the polyzoal limestone, and below for a little over 100 feet are sands and clays, which, although unfossiliferous, probably correspond to the lower of the Eocene beds shown by the four bores; the bed-rock was just about reached at the bottom, 167 feet below sea-level.

If the lines of demarcation are marked out on the map as far as possible, they will be found very irregular in shape, and the thickness of each bed varies greatly, the irregularity of the line of separation of the Eocene polyzoal limestone and the underlying clays, apparently showing that their formation depended partly at any rate, on purely local causes, as we cannot consider the intercalated sands and clays to have been denuded into their present shape to make room for the overlying polyzoal limestone.

It seems probable that this limestone is a continuation of the somewhat similar beds at Bordertown, and unites them to the Murray beds at Tailem Bend and Wellington. If this is actually the case, we have very good evidence to show that the Aldinga and Adelaide gastropod-beds are older than the Eocene beds of the Murray since, as mentioned before, the sands of the Ki Ki Bore seem to closely approximate in their fossils to the Adelaide beds.

A peculiarity about the more recent deposits overlying these Eocenes, is the fact that in the Tintinara Bore alone do we meet with recent marine shells, while we get here none of the unfossiliferous limestone which in each of the other beds overlies the Eocene limestone. These fossils bespeak an extremely recent age, Pleistocene if not Post-pleistocene, and it seems strange that they are not met elsewhere. The probable explanation is, that at Tintinara, (as in the other bores) in post-Eocene times the Eocene deposits became covered with this unfossiliferous limestone, presumably a land formation, but that subsequently it was worn away at Tintinara, and with it very likely some portions of the polyzoal limestone, which is here reduced to six feet in thickness,

and then very recently this gap was filled up by a sandy material containing these shells, which are in a very good state of preservation. The relationship of these beds is shown on the diagram, representing a section along the railway line from Bordertown to Tailem Bend.

The Eocene beds of the Mount Gambier district are entirely isolated from all other Eocene deposits, not only by their position, far removed from all other places where outcrops occur, but also by their fauna, which, with the exception of polyzoa, is extremely limited, consisting of about sixteen molluscs and six echinoderms, many of which are widespread forms. However, by the wells at Bordertown and Pinnaroo, we see the probable continuity of the Mount Gambier beds with those at Overland Corner, while the four bores in the Ninety-Mile Desert show that the same beds, at a lower depth, join on to the Murray Beds at Tailem Bend, and thus it is safe to say that the Murravian and Mount Gambier Eocenes are portions of the same deposit.

Then also the similarity of the fauna of the sands met with in the Ki Ki bore with that of the Aldinga marls, would show that these two beds were deposited at the same time, from which we might infer that the polyzoal limestone which overlies the marls at Aldinga is contemporaneous with the similarly composed beds resting on the sands and clays, as shown in the accompanying diagram, and therefore with the Mount Gambier and the Murravian deposits. Still, we see from the four bores above described that the line of separation of the sands and clays from the overlying polyzoal rock is very irregular, which tends to prove that, although on the whole the sands are the older of the two beds, nevertheless they were being deposited at the same time in localities very near together, and that therefore local causes had a good deal to do in determining their deposition; so that considering how far removed are Aldinga and the Murray Cliffs, we might be making a mistake in saying that the Aldinga marls are older than the Murravian limestone, though this is probably the case; and at any rate we may be fairly safe in concluding that no period of any length separated their formation.

SUPPLEMENTARY NOTE.

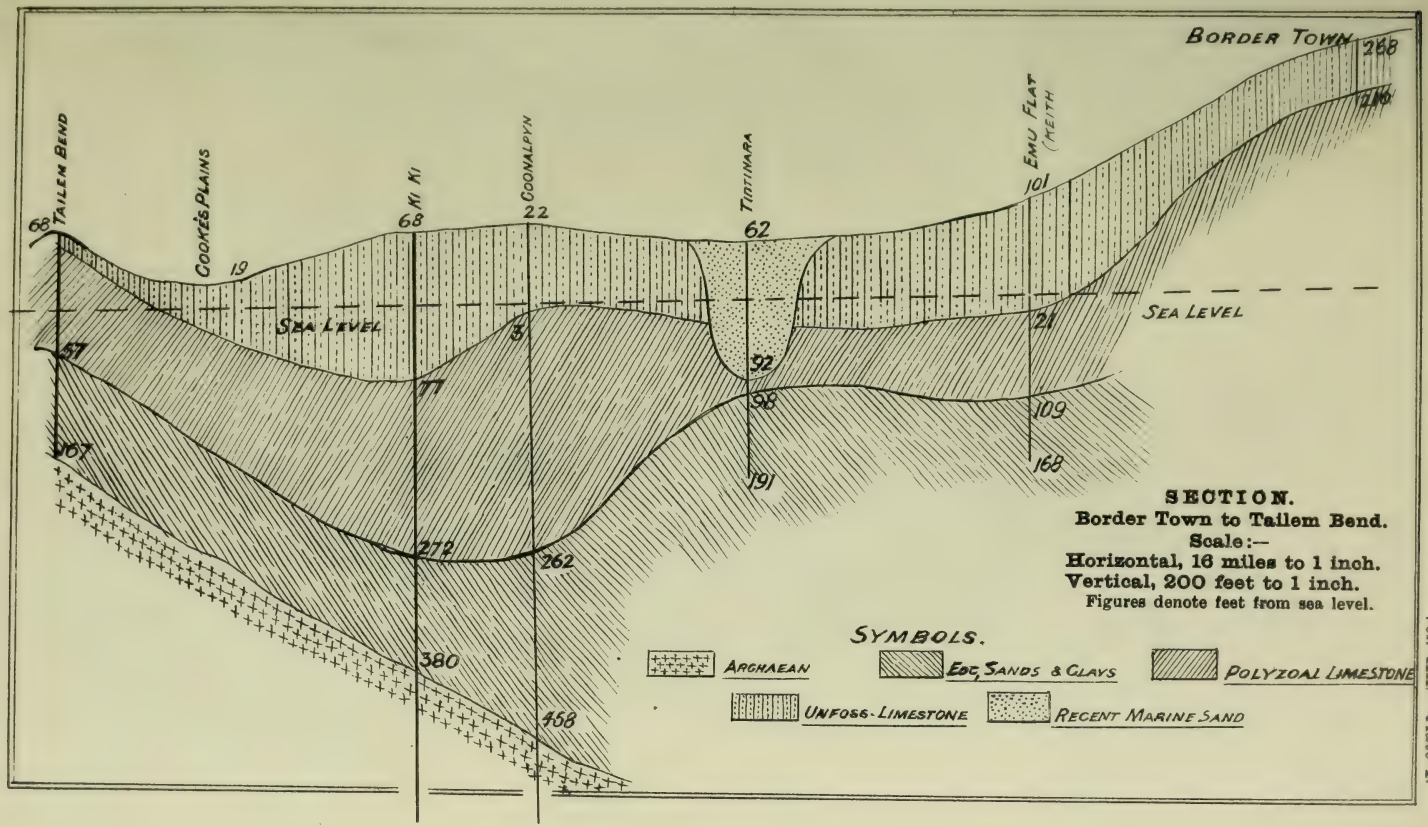
Since the above was written Professor Tate has examined fossils from the Eocene sands of the Ki Ki bore (380-424 feet below the surface) and has identified the following species and genera :—

Terebratulina, sp. (prob. fry of T. Scoulari, *Tate*). (passim).
Crassatella communis, *Tate*. (passim.)

Carditella, *n. sp.*
Limopsis multiradiata, *Tate.* (Aldinga.)
Plagiarca cainozoica, *Tate,* (passim.)
Trophon, *sp.* aff. polyphyllus, *T.-Woods.* (Muddy Ck., Spring Ck., Mornington.)
Triton, *sp. indet.*
Tritonidea, *n. sp.*
Nassa? *sp.*
Ancillaria ligata, *Tate.* (Aldinga.)
Trivia, *n. sp.* aff. T. pompholugota, *Tate.*
Turritella, *sp.*, worn (prob. T. Aldingæ, *Tate*). (Aldinga. Cape Otway.)
Eulima, *n.* (?) *sp.*
Ataxocerithium concatenatum, *Tate.* (Aldinga. Muddy Creek.)
Triforis, *sp.* (Aldinga.)
Lovenella, 5 *spp.*
Litiopa, *n. sp.*
Rissoa, *sp.* (Muddy Creek.)
Rissoa, 2 *n. spp.*
Liotia Roblini, *Tate.* (River Murray, Muddy Creek, Table Cape.)
Delphinula, 2 *n. spp.*
Phasianella, *n. sp.*
Leptothyra parvula, *T.-Woods.* (Muddy Creek. Corio Bay.)
Leptothyra, *sp.*
Calliostoma, *sp.*
Euchelus, *sp.*
Meretrix, *sp.*, indet.
Amphihelia striata, *T.-Woods.* (Aldinga.)

n. sp. signifies not identical with any belonging to other Eocene sections in Australia.

The names in brackets after various species are the localities whence those species have already been obtained, "passim" denoting a species found at all, or nearly all, Australian Eocene outcrops. Professor Tate remarks, with regard to the fossils *tous ensemble*, "Specimens usually much broken, or juvenile; hence specific determination not admissible, or only by troublesome comparisons, which time has not permitted to be given." This accounts for the large number on the list unnamed. Of those that have been worked out, we have in all 23 species, of which ten are hitherto unrecorded, and three widely distributed; while of the others six have been found at Aldinga and Adelaide, four being till now unrecorded elsewhere, and five at Muddy Creek, to which place, however, only one is peculiar. Thus we


BORDER TOWN
TAILEM BEND
COOMÉE PLAINS
MI MI
COONALPYN
TIATINARA
EMU FLAT (KEITH)
SEA LEVEL
SEA LEVEL
68
19
68
22
62
101
21
57
77
3
92
98
109
267
191
168
272
262
380
458
SECTION.
Border Town to Tailem Bend.
Scale:—
Horizontal, 16 miles to 1 inch.
Vertical, 200 feet to 1 inch.
Figures denote feet from sea level.
SYMBOLS.
ARCHAEAN
EOC. SANDS & CLAYS
POLYZOAL LIMESTONE
UNFOSS. LIMESTONE
RECENT MARINE SAND

are justified in saying that the fauna more resembles that of Aldinga than of any other locality.

From the Tintinara bore, at a depth of 244 to 253 feet, were obtained the following lamellibranchs among other molluscs not yet worked out :—

Leda planiuscula, *Tate.* (Aldinga.)

Leda sp. aff. leptorhyncha, *Tate.*

Limopsis insolita, *Sowerby.* (Aldinga, Spring Creek, Cape Otway).

Arca n. sp. aff. A. equidens, *Tate.*

Cardita (?) n. sp.

Correlation of the Marine Tertiaries of Australia.

Part III., South Australia and Tasmania.

With General Remarks and Appendices.

By Professor Ralph Tate and J. Dennant, F.G.S., F.C.S., &c.

[Read May 5, 1896.]

Plate II.

Chapter I. South Australia.

I. Geographic Distribution of Eocene Strata.

The chief areas occupied by deposits of this epoch are :—

1. The plateau terminating in the sea-wall extending from Wilson Bluff on the West Australian Boundary to the Head of the Great Australian Bight.* The coast section has been described.

2. *Spencer Gulf.*—Point Turton in the southern part of Yorke Peninsula is an outlier of polyzoal limestone †, also about the shore of Wallaroo Bay, and extending inland to Boor's Plain.

3. *St. Vincent Gulf.*—The west shore extending from Edithburg to near Black Point is occupied by cliffs of polyzoal limestones ; a representative section is that of Surveyor's Point‡ ; outliers occur to the north of Black Point in the neighbourhood of Ardrossan. §

On the east shore-line of St. Vincent Gulf, older Tertiary strata developed beneath Adelaide and its immediate vicinity have been described. ||

The older Tertiary sections, displayed in the sea-cliffs of Aldinga Bay, to which reference has been made in some of the above-quoted papers, have not been described in detail, an omission that it is now sought to supply. A brief summary was,

* Tate, Trans. Roy. Soc., S. Aus., II., pp. 102-111, 1879.
† Tate, id., XIII., pp. 112-114, 1890.
‡ Pritchard, id., XV., pp. 179-180, 1892.
§ Tepper, Roy. Soc. S. Aust., II., pp. 72-76, 1879.
|| Tate, id. V., p. 40, 1882 ; XIII., p. 180, 1890.

however, published in 1878 (Tate, Roy. Soc., S. Aust., I., p. 121) as under :—

a. Lacustrine clays, no fossils... .. ... 48 ft.
b. Upper Aldinga Series, calciferous sandstones and impure limestones with oyster banks ... ... 22 ft.
c. Lower Aldinga Series, consisting of beds of a most diversified character—clays, limestones, and sands, rapidly replacing one another in horizontal and vertical extension ... ... 80 ft.

A correlation with other sections was attempted by the same author, *op. cit.* II., p. liii., and at p. lviii. the term Eocene was applied to the Lower Aldinga Series, and that of Miocene to the Upper Series.

4. *Kangaroo Island.*—The small outlier of Eocene limestone near Kingscote, first indicated by Peron, has been described by Tate, *op. cit.* VI., p 122, 1882.

5. *River Murray Plain.*—The literature relating to the geology of this extensive area, as well as detailed descriptions of the sections, age, and correlation, has been dealt with by Tate, *op. cit.* VII., pp. 24-41, 1885.

6. *Mount Gambier District.*—Tenison Woods' "Geological Observations," London, 1867, embodies the chief literature relating to the geology of this area.

Mr. Edward V. Clark, in a paper read this year before this Society submits proof of the subter-connection of the limestones of the Mount Gambier area with the more arenaceous beds of the Murravian area, and indicates the occurrence of deeper-seated sands, the fossils of which seem to be part of the fauna characterising the inferior beds of the Aldinga section.

II. Miocene and its Relation to Eocene.

1. *River Murray Cliffs.*—The oyster-beds or Upper Murravian Series were detached from the underlying Eocene calciferous sandstones on palæontological data, but re-examinations of the section in the cliffs at Nor-West Bend leave no doubt of a genuine erosive surface between the two sets of beds.

2. *Adelaide.*—Burr* was the first to describe the lithological features of the beds on which the city of Adelaide stands, and considered them to belong to the Tertiary period, without assigning any definite age. Sturt recognised, however, that these beds

* "Remarks on the Geology of South Australia," Adelaide, 1846.

were of "the same kind of fossil formation as that on the banks of the Murray." This correlation applies to the Miocene only.

3. *Aldinga Bay* and *Hallet's Cove*, east side of St. Vincent Gulf.

Only the basal part of the Miocene Series is here fossiliferous, and because of the prevailing sandy matrix, the majority of the fossils are in the state of casts, though occasionally, when the matrix is more consolidated and somewhat calciferous, the tests of the fossils occur as pseudomorphs after calcite, though those originally calcitic are unaltered.

The fossiliferous Miocene beds directly overlie those of the Eocene, and the stratigraphical discordance between them is marked by erosive surfaces, more or less of the nature of pot-holes, but more particularly by the transgression of the Miocene over the edges of the Eocene strata, which have a higher dip: this feature is most discernible in the face of the cliffs extending from the jetty southward towards Schnapper Point for a length of a hundred chains. The topmost of the hard arenaceous bands of the Miocene in Blanche Point, which is at an elevation of 80 feet above sea-level, declines to high water-mark at Schnapper Point in a distance of two miles, corresponding with a dip of 1 in 132. In Maslin's Beach to the north of Blanche Point, the echinodermal bed of the Eocene shows a dip of 2° 7′ in approximately the same direction, that is south-west, as that of the observed inclination of the Miocene to the south of the jetty; but moreover, in the north face of Blanche Point, which has approximately an east and west bearing, the Eocene strata have a dip of 5°, whilst the Miocene beds are apparently horizontal.

At the mid-part of the Aldinga Bay section the Miocene consists, in the basal portion of sharp sands and calciferous sandstone, and in the upper portion of unfossiliferous blue clays, which change to the northward into red mottled sands and sandy clays, also unfossiliferous.

Beyond the limits of the occurrence of Eocene beds to the northward, as about Pedlar's Creek (sections 353, 356, 359, see map), the base of the Miocene is a conglomerate, resting on Archæan rocks, succeeded by a calciferous sandstone more or less commingled with pebbly grit in which fossils occur; the uppermost and larger part of the sections consists of variously colored sands and sandy clays. The finest sections of this type occur from a little north of Witton Bluff, by the mouth of the River Onkaparinga to beyond Black Point, forming the north headland of Hallett's Cove; beyond this the Miocene thins off and is represented by the conglomerate-base, which on the cliffs at Marino, south side of Holdfast Bay, is covered by the mammaliferous drift of the Adelaide Plain.

The section at Hallett's Cove is as follows :—

	Feet.
Red and grey argillaceous sands	80
Sand-rock	1
Sands (yellow)	50
White chalky limestone, with much sharp quartz-sand interspersed; fossiliferous	4
	135

The common fossils are *Potamides* sp., *Pecten antiaustralis*, *P. consobrinus*, *Spondylus Aldingensis*,* *Placunanomia Ione*, *Ostrea arenicola*, *Anapa variabilis*, *Laganum platymodes*, and *Orbitolites complanata*.

III. The Eocene of Aldinga Bay.

Though a reference to this most important and instructive section was published as early as 1878, yet as previously stated, no detailed description has been given. The characteristic features of it are:—The varied nature of its sediments, the largely unique fauna, and diverse life-groups co-ordinate with the change in sedimentation.

The Eocene beds occupy a continuous section of nearly three miles in length, commencing about 40 chains due north of Blanche Point, and terminating southwards on the approach to Schnapper Point, where they descend below sea-level, but they reappear on the extreme south of Aldinga Bay. (See map.)

The Eocene and the overlying Miocene occupy a small basin of low-level country bounded all round, except the sea-frontage, by more elevated country occupied by Archæan rocks. The most inland occurrence of Eocene strata is at Tintaro (Section 681, Hundred of Willunga) about five miles due East from the coast.

The maximum inclination of the Eocene strata is 5° in a direction W. 10° S., from which is deduced an increasing altitude in an easterly direction; this is partly corroborated by a few well-sinkings and quarries situated at various distances, up to a mile or so from the coast. The occurrence of bedded deposits with *Turritella Aldingæ* at elevations up to 250 feet in Maclaren Vale (sections 126, 127, 137), and of blocks of a siliceous rock charged with Eocene fossils at an elevation of 600 feet at Tintaro (section 681), cannot be accounted for on the basis of the observed dip of the coastal sections; but they point to a basal deposit having a slope corresponding with that of the surface on which they rest.

* *Pecten spondyloides*, mihi, proves to be a Spondylus, and as the original species-name is incompatible with the revised generic location, it is altered as above.—R.T.

The diversified material composing the Eocene strata as seen on the coast, the arrangement of the material, and an increasing altitudinal range passing inland, point to a large fan-like accumulation adjacent to a sinking land-surface with a sea-scarped front, over which the sediments have been poured down. If such has been the case, it is not possible to determine the thickness of the mass on the basis of an observed inclination and horizontal extension of the deposit; moreover, it appears as we recede from the main locus of accumulation that the nature of the material changes, and finally gives place uniformly to a polyzoal limestone, such as characterises the line of sea-cliffs on the west side of St. Vincent Gulf. And it is noteworthy that this last deposit, uniform in itself, contains the more widely diffused organic remains; the more local sediments have for the most part restricted species.

A similar, but smaller, basin is that which has its chief locus of accumulation in Witton Bluff, being separated from the former by the Archæan outcrop, which extends inland from near the mouth of Pedlar's Creek.

It is impossible by words to adequately convey to the mind the changing nature of the Eocene sediments composing this section, but as making some approach in that direction, a few vertical sections at varying intervals throughout the whole cliff frontage are now presented :—

North of Blanche Point, Maslin's Bay (1) in Alignment of E. & W. Road Between Sections 374 and 375.

		ft.	in.
52 ft.	Greenish marly sand rock and mottled (red and white) sand rock	30	8
	Whitish-yellow nodular impure limestone White and brown sands in courses ...	21	4
Eocene. 68 ft.	Glauconitic limestone	4	0
	passing into sand	3	0
	Iron-shot sand, drift-bedded —	61	0
	High-water-mark		

North of Blanche Point, Maslin's Bay (2).

		ft.	in.
	Recent travertine and soil	5	6
Miocene. 64 ft. 6 in.	Green marly sand-rock ... ... about	12	0
	Red and white (mottled) sand-rock ... about	25	0
	Raggy white calcareous sand-rock	6	6
	Fine yellow sand...	1	2
	White calcareous sandy clay with calcareous bands	19	10
Eocene. 39 ft. 8 in.	Glauconitic white limestone, very fossiliferous, rich in echinoids and palliobranchs	4	0
	Greenish colored sands somewhat calcareous	11	0
	Brown iron-shot sands (teeth of *Lamna* sp.)...	24	8
	High water-mark		

South Projection of Blanche Point (3).

		ft.	ins.
Recent.	Soil and travertine	—	
Miocene. 60 ft. 5 ins.	Whitish sand clays	38	0
	Red and greenish clays		
	Rubbly limestone	9	6
	White arenaceous limestone (fossiliferous) ...	1	0
	White sand	6	8
	Cavernous limestone	3	9
	Red sand with oysters	2	6
Eocene. 58 ft. 4 ins.	Brown sandy marls	29	0
	Blackish calcareous clays, in bands, with indurated surfaces	10	4
	Ditto, with courses of turritellæ and nodular limestone	20	0
	Low-water mark		
		120	9

Cliff Section, North of Jetty, and South of Blanche Point (4).

Miocene. 14 ft.	Grey limestone ... ... about	14	0
Eocene. 40 ft. 10 ins.	Yellow calciferous sand... ... ... about	24	0
	Polyzoal bed—a coarse sand and small gravel with polyzoa (at certain points this bed is exclusively composed of polyzoa compacted into a fissile, current-bedded rock)	5	6
	Fine grey sand with small gravel	0	10
	Green and yellow clayey sand	2	2
	Brick-red clayey sand	0	7
	Brown, and yellow and brown, clayey sand...	2	3
	Black clay, very fossiliferous*..	5	6

High water-mark, below which argillaceous limestones appear.

Port Willunga Jetty (5).

Miocene. 60 ft. 4 in.	Soil and travertine	6	0
	Blue clay	41	0
	Rubbly grey limestone mixed with sand in lower part; casts of fossils	7	7
	Arenaceous calcareous bands with intercalated sands.† Oyster bed, at a depth of 4 ft. 3 in. from top.	11	9
	Unconformity.		
Eocene. 19 ft. 6 in.	Calciferous sand-rock with hard concreted portions at top and siliceous bands at bottom.‡	19	6
	High water-mark.		

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*Common fossils—*Chione cainozoica, Limopsis insolita, Triton tortirostris.*

†Common fossils.—*Ostrea arenicola, Pecten lucens, P. subbifrons, P. antiaustralis, Spondylus Aldingensis (Pecten spondyloides), Laganum platymodes.*

‡*Scaveria Mariæ, Waltheimia furcata, W. sufflata, Magasella Woodsiana, Pecten Eurei, Fibularia gregata, Graphularia senescens.*

South Side, Aldinga Bay.

Front of "red loam" cliffs faced by a mural line of calcareous rock, largely made up of echinodermal and polyzoal debris; the upper part rather harder and weathering ruggedly and fantastically; the lower part hollowed out into caves and tunnelled through to the "red-loam" at the back. Height of wall about 20 ft. Dip apparently west; the whole seems as it it had been thrust forward by the weight of the "red loam."

The glauconite limestone is rich in palliobranchs and echinoderms, some of the former and most of the latter being confined to it.

The lower portions of the Turritella-banks of Blanche Point contain very few species, though densely packed with *Turritella Aldingæ*, and with *Entalis subfissura* common. Towards their upper part, species occur in considerable numbers, and individuals abound; among the commoner ones may be mentioned:—*Peristernia Aldingensis*, *Murex sublævis*, *Triton oligostirus*, *Voluta pagodoides*, *Ancillaria ligata*, various species of *Pleurotoma*, *Erato pyrulata*, *Trivia avellanoides*, *Natica Aldingensis*, *Amussium Zitteli*, *Leda Huttoni*, *L. planiuscula*, *L. apiculata*, *L. leptorhyncha*, *Arca equidens*, *Cardita latissima*, *Meretrix tenuis*, *Corbula pyxidata*, *Myodora lamellata*, *Terebratulina triangularis*, *Trochocyathus heterocostatus*, *Notocyathus Tateanus*, *Bistylia adherens*, and other corals.

The marls which succeed are sparsely fossiliferous, and the fossils are not always obtainable in good condition, but the best time for collecting is in fine weather, just after a copious rain. For the most part, the species have ascended from below; but a species of *Potamides* may only be obtained here. Continuing south to the cliff section No. 4, the marls pass to the condition of a black clay, containing many of the species belonging to the Blanche Point marls, of which *Limopsis insolita* is profusely abundant, and of large size; hence the bed has been called the "Limopsis-clay."

The calciferous sand-rock so extensively developed on the south side of Port Willunga Jetty does not contain a great variety of fossils, though individuals are fairly abundant; the chief species, except among the Polyzoa, are:—*Pecten Eyrei*, *Waldheimia furcata*, *W. Garibaldiana*, *W. sufflata*, *Scalaria Mariæ*, *Eupatagus decipiens*, *Maretia anomala*, *Antedon sp.*, *Graphularia senescens.*

In the following summary and table of species belonging to the Adelaide and Aldinga sections, account is taken of the Eocene strata only.

I. PALÆONTOLOGICAL SUMMARY.

Aldinga and Adelaide (Eocene).

	No. of Species.	No. of Restricted Species.
Pisces	2	0
Cephalopoda	2	0
Gastropoda	182	126
Scaphopoda	3	1
Pteropoda	1	1
Lamellibranchiata ...	77	35
Palliobranchiata	25	7
Polyzoa	47	16
Echinodermata	22	7
Zoantharia	14	9
Total	375	202

With this total of 375 species, 184 genera are represented, being an average of little more than two species to each genus, which is a high proportion of diversity.

Though only two genera are peculiar, viz, one bivalve (*Limarca*), and one coral (*Bistylia*), yet the stratigraphical distribution of several genera is of a high antiquity :—*Plagiarca*, *Plesiotriton*, *Clavilithes*, *Conorbis*, *Mesalia*, and *Ampullina* among Mollusca; *Paradoxechinus*, *Holaster*, *Cardiaster*, and *Hemiaster* among Echinodermata ; *Notocyathus*, *Trematotrochus*, *Conosmilia*, *Cyathosmilia*, and *Graphularia* among Zoantharia.

Of all the Australian sections they are the richest in in Palliobranchs and Echinoids.

The living species of Mollusca (except Polyzoa) are *Saxicava australis* and *Rhynconella squamosa*, or two in a total of 290, which equals ·69 per cent.

The percentage of restricted species is 54, whilst a considerable number of the extra-limital species are in common, either separately or collectively, with Cape Otway and Spring Creek.

II. LIST OF EOCENE FOSSILS.

Aldinga and Adelaide.

[Index numbers to localities :—1, Cape Otway ; 2, Table Cape ; 3, Spring Creek ; 4, Geelong ; 5, Birregurra ; 6, Camperdown ; 7, Gellibrand ; 8, Muddy Creek ; 9, Murray River ; 10, Mornington ; 11, Bairnsdale ; 12, Mount Gambier.]

GASTROPODA.

Typhis tripterus, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
" tetraphyllus, *Tate*, n. sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Murex calvus, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-	-
" manubriatus, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" bifrons, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-	-
" Adelaidensis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" tenuicornis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" sublævis, *Tate*	-	-	3	-	-	-	-	-	-	-	-	-	-
" asperulus, ? *Tate* ...	-	-	?3	-	-	-	7	8	-	10	-	-	
" prionotus, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-	-

Murex tridentatus, *Tate* ...	-				-			-	-	-	-	-
" sp. (aff. M. tesselaris) ...	-	-	-	-	-			-	-	-	-	-
Muricidea torquata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" hypsella, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-
" monotropis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" icosiphyllus, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Triton cribrosus, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-
" oligostirus, *Tate*.. ...	-	-	-	-	-	-	-	-	-	-	-	-
" sp.	-	-		-	-	-	-	-	-	-	-	-
Epidromus nodulatus, *Tate* ...	-			-	-	-	-	-	-	-	-	-
Plesiotriton varicosus, *Tate* (Cantharus)	-	-	-	-	-	-	-	-	-	-	-	-
Fusus cochleatus, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" sculptilis, *Tate*	-	-		-	-	-	-	-	-	-	-	-
" (Tectifusus) tholoides, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" (Tectifusus) Aldingensis, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Clavilithes incompositus, *Tate* .	1	-	-	-	-	-	-	-	-	-	-	-
" sp. (indet.)	-	-	-	-	-	-	-	-	-	-	-	-
Cominella pertusa, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" pumila, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Peristernia Aldingensis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" apicilirata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" actinostephes, *Tate* .	-	-	-	-	-	-	-	-	-	-	-	-
" sp. (aff. P. Murrayana)	-	-	-	-	-	-	-	-	-	-	-	-
Voluta protorhysa, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" cribrosa, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-
" pagodoides, *Tate* ...	1	-	3	-	-	-	-	-	-	-	-	-
Mitra varicosa, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" complanata, *Tate*... ...	-	-	-	-	-	-	-	-	-	-	-	-
" subcrenularis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" citharelloides, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" pumila, *Tate* (Peristernia)	-	-	-	-	-	-	-	-	-	-	-	-
Marginella Aldingæ, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" subwentworthi, *T. Woods*	1	2	-	4	-	-	7	8	9	10	-	-
" submicula, *Tate* ...	-	-	-	-	-	6	7	8	-	-	-	-
" sulcidens, *Tate* ...	-	-	-		-	-	-	-	-	-	-	-
Oliva Adelaidæ, *Tate*	-	-	3	-	-	6	7	-	-	-	-	-
Ancillaria ligata, *Tate*	-	-	3	-	-	6	-	-	-	-	-	-
" subgradata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Harpa Clarkii, *Tate*	(aff *H Gradata*)											
Columbella cryptacris, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Cancellaria ptychotropis *Tate*...	-	-	3	-	-	-	-	-	-	-	-	-
" turriculata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" micra, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" 2 spp.	-	-	-		-	-	-	-	-	-	-	-
Trichotropis angulifera, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" tabulata, *Tate* ...	-	-	-	-	-	-	-	-	-		-	-
" triplicata, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" interlineata, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" costata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" fenestrata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Conorbis atractoides, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Daphnella, 3 spp.	-	-	-	-	-	-	-	-	-	-	-	-
Raphitoma, 4 spp.	-	-	-	-	-	-	-	-	-	-	-	-

Sureula, 14 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Pleurotoma sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Metula ? sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Cypræa ovulatella, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-	-
" (Cyprædia) clathrata, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
Trivia avellanoides, *McCoy* ...	1	2	3	4	-	6	7	8	9	10	-	-	
" pompholugota, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Erato australis, *Tate*	1	2	-	-	-	-	7	-	-	-	-	-	-
" pyrulata, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-	-
Crossea princeps, *Tate*	-	2	-	-	-	-	-	8	9	-	-	-	-
Scalaria (Punctiscala) loxopleura, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" (Cirsotrema) Mariæ, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
" (Cirsotrema) pleiophylla, *Tate* ...	-	-	3	4	-	-	-	-	-	-	-	-	-
" (Cirsotrema) sp. ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" (Hemiacirsa) lampra. *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
Natica Aldingensis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" Hamiltonensis, *T. Woods*	-	-	3	4	-	-	7	8	9	10	-	-	
Ampullina effusa, *Tate*... ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Calyptræa placuna, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Capulus circinatus, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Calyptropsis arachnoideus, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
Torinia Simsoni, *Tate*	1	2	3	-	-	-	-	-	-	-	-	-	-
" ephamilla, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Discohelix sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Turritella Aldingæ, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-	-
Mesalia stylacris, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-	-
Mathilda bicarinata, *Tate* ...	-	-	3	-	-	-	-	-	-	-	-	-	-
" cribarioides, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" umbilicata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Thylacodes actinotus, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
" asper, *Tate*... ...	-	-	-	-	-	-	7	-	-	-	-	-	-
" Adelaidensis, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
Tenagodes occlusus, *T. Wds*....	-	2	3	-	-	-	7	8	9	10	-	12	
Eulima acutispira, *T. Wds.* ...	1	-	3	-	-	-	7	8	-	-	-	-	
" Danæ, *T. Wds.* ...	1	-	3	-	-	6	7	8	-	10	-	-	
" sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Niso sp. (aff *N. psila*)	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbonilla, 5 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Aclis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Odostomia, 4 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Eulimella, 2 spp....	-	-	-	-	-	-	-	-	-	-	-	-	-
Dialopsis ? sp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ataxocerithium ? 2 spp. ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrazus Aldingensis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-
Triforis reversa, *Tate*	-	-	-	-	-	-	-	8	-	-	-	-	-
" 5 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Colina pagoda, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-	-
Lovenella triserrata, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-	-
" 8 spp....	-	-	-	-	-	-	-	-	-	-	-	-	-
Rissoa, 2 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Liotia, 2 spp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclostrema, sp....	-	-	-	-	-	-	-	-	-	-	-	-	-
Tinostoma princeps, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-	-

Astralium, 2 spp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Leptothyra sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Diloma, 3 spp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Solariella, 2 or 3 spp. ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Euchelus sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Basilissa Cossmanni, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
Calliostoma, 3 spp. ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Astele sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Emarginula, 3 spp. ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Triploca ligata, *Tate* ...	...	1	-	-	-	-	-	-	-	-	-	-	-	
Actaeon, 3 spp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Leucotina sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Bulimella angustata, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
" callosa, *Tate*..	...	1	-	-	-	-	-	-	-	-	-	-	-	

SCAPHOPODA.

Entalis Mantelli, *Zittel*...	...	1	2	3	4	-	6	7	8	9	10	N.Z.		
" subfissura, *Tate*	...	1	2	3	4	-	6	7	8	9	10	-	-	
Dentalium triquetrum, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	

PTEROPODA.

Styliola annulata, *Tate*...	...	-	-	-	-	-	-	-	-	-	-	-	-	

LAMELLIBRANCHIATA.

Ostrea hippopus, *Tate* non *Lk.*	?=Gryphaea tarda													
Gryphaea tarda, *Hutton*	...	1	-	3	-	-	-	7	8	N.Z.				
Dimya sigillata, *Tate* ...	...	-	-	3	-	-	-	-	-	-	-	-	-	
? " dissimilis, *Tate* ...	..	passim			-	-	-	-	-	-	-	-	-	
? Placunanomia sella, *Tate*	...	-	2	3	4	-	-	7	8	9	10	N.Z.		
Anomia cymbula, *Tate* ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Pecten Aldingensis, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
" consobrinus, *Tate*, var. or n. sp.	...	-	-	3	-	-	-	-	-	-	-	-	-	
" Eyrei, *Tate* ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
" Flindersi, *Tate*...	...	-	-	-	-	-	-	-	-	-	-	-	-	
" Hochstetteri, *Zittel*	...	1	-	3	-	-	6	-	-	9	-	-	12	
" Peroni, *Tate* ...	...	-	-	? 3	-	-	-	-	-	-	-	[N.Z.		
? " subbifrons, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
Amussium Zitteli, *Hutton*	...	passim												
Hinnites Corioensis, *McCoy*	...	-	-	-	4	-	-	-	-	9	-	11	NZ	
Lima Bassi, *T. Wds.* ...	...	1	2	-	4	-	-	7	8	9	10	N.Z.		
" polyactina, *Tate* ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Limatula Jeffreysiana, *Tate*	...	-	2	3	-	-	-	-	8	9	10	11	12	
" polynema, *Tate*	...	-	-	3	-	-	-	-	-	-	-	[N.Z.		
Limea alticostata, *Tate*...	..	-	-	-	-	-	-	-	-	-	-	-	-	
" sp. (aff. L. transenna)	...	-	-	-	-	-	-	-	-	-	-	-	-	
" n. sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Spondylus gaederopoides, *McCoy*	...	-	2	3	-	-	-	7	-	-	-	11	-	
Avicula nasuta, *Tate* ...	...	-	-	-	-	-	-	-	-	-	-	-	-	
Vulsella laevigata, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
Perna sp.	...	N.Z.												
Modiola Adelaidensis, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
" sp. (aff. M. albicostata)	-	2	3	-	-	-	-	-	-	-	-	-	-	
Mytilus sp.	...	-	-	-	-	-	-	-	-	-	-	-	-	
Modiolaria arcacea, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	
" subgranosa, *Tate*	...	-	-	-	-	-	-	-	-	-	-	-	-	

Crenella globularis, *Tate* ...	-	2	3	-	-	-	-	8	9	10	-	-
Nucula semistriata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Leda apiculata, *Tate*	1	2	3	4	-	-	7	8	-	10	-	-
" Huttoni, *T.-Wds.*... ...	-	2	3	-	-	6	7	8	-	10	-	-
" leptorhyncha, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-
" planiuscula, *Tate*... ...	-	-	-	-	-	-	-	-	-	-	-	-
Limopsis insolita, *Sow* ...	1	-	3	N.Z.	-	-	-	-	-	-	-	-
" multiradiata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" sp.	-	-	-	-	-	-	-	-	-	-	-	-
Limarca angustifrons, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Pectunculus cainozoicus, *T. Wds.*	-	2	3	-	-	6	-	8	-	-	-	-
" lenticularis, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Arca (Fossularca) equidens, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" " dissimilis, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
" pseudonavicularis, *Tate*...	-	2	-	-	-	-	-	-	-	-	-	-
Plagiarca cainozoica, *Tate* ...	passim											
Barbatia limatella, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Cucullaea Adelaidensis, *Tate* ..	-	-	-	-	-	-	-	-	-	-	-	-
Crassatella aphrodina, non *T. Wds.* (?) ...	New species											
" communis, *Tate** ...	-	2	3	4	-	6	7	8	9	10	11	-
" corrugata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Mytilicardia alata, *Tate* ...	-	-	3	-	-	-	-	-	-	-	-	-
" curta, *Tate*... ...	-	-	-	-	-	-	-	-	-	-	-	-
Cardita latissima, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Carditella lamellata, *Tate* ...	-	-	-	-	5	-	-	-	-	-	-	-
" radiata, *Tate* ...	1	-	3	-	-	6	-	-	-	-	-	-
" rugosa, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Chama lamellifera, *T. Wds.* ...	-	2	3	4	-	-	7	8	9	10	-	-
Cardium monilitectum, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" hemimeris, *Tate* ...	-	-	-	4	-	-	-	8	9	-	-	-
Chione cainozoica, *T. Wds.* ...	1	2	3	4	-	-	-	8	9	10	-	-
" multitaeniata, *Tate* † ...	1	-	3	-	-	-	-	-	-	-	-	-
Meretrix tenuis, *Tate*	1	-	3	-	-	-	-	-	-	-	-	-
Dosinia imparistriata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Tellina porrecta, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Myodora lamellata, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-
" tenuilirata, *Tate* ...	-	-	3	4	-	6	7	8	9	10	-	-
Thracia perscabrosa, *Tate* ...	8	-	-	-	-	-	-	-	-	-	-	-
" sp.	-	-	-	-	-	-	-	-	-	-	-	-
Corbula pyxidata, *Tate* ...	1	-	3	-	-	-	7	-	-	10	-	-
Cuspidaria Adelaidensis, *Tate*...	-	-	-	-	-	-	-	-	-	-	-	-
" latesulcata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Saxicava australis, *Lam.* ...	1	8	Recent									
Jouannetia cuneata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Teredo Heaphyi, *Zittel*... ...	-	-	-	-	-	-	-	-	9	N.Z.		
Aspergillum teredina, *Tate* ...	-	2	3	-	-	-	-	-	-	-	-	-
Clavagella lirata, *Tate*	-	-	-	-	-	-	-	8	-	-	-	-

PALLIOBRANCHIATA.

Terebratula Aldingæ, *Tate* ...	N.Z.	-	-	-	-	-	-	-	-	-	-	-
" bulbosa, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" subcarnea, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-

* C. astartiformis non *Nyst.*
† C. multilamellata non *Br.*

Terebratula vitreoides, *T. Wds.*	-	2	3	4	-	-	7	8	9	10	11	-
Waldheimia fimbriata, *Tate* ...	1	-	-	-	-	-	-	-	8	?	-	-
" furcata, *Tate* ...	1	-	-	-	-	-	-	-	-	-	-	-
" insolita, *Tate* ...	1	-	3	4	-	6	7	8	-	10	11	12
" Johnstoniana, *Tate*	-	-	-	-	-	-	-	-	-	-	[N.Z.	
" pectoralis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" sufflata, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" Tateana, *T. Wds.*..	-	2	-	-	-	-	7	-	9	-	-	-
" Vincentiana, *Tate*.	-	-	-	-	-	-	-	-	-	-	-	-
Terebratella furculifera, *Tate* .	N.Z.											
" pentagonalis, *Tate*	-	2	?	-	-	-	-	-	-	-	-	-
" Tepperi, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Terebratulina catinuliformis, *Tate* *	-	2	?	3	4	-	-	-	9	-	-	12
Terebratulina lenticularis, *Tate*	-	2	?	-	4	-	-	-	8	9	-	-
" Scoulari, *Tate* ...	-	2	-	-	4	-	6	-	8	9	10	N.Z.
" triangularis, *Tate*	1	-	-	-	-	-	-	-	-	-	-	-
" sp.	-	-	-	-	-	-	-	-	-	-	-	-
Magasella compta, *Sow.* ...	-	-	3	-	-	6	7	8	9	-	11	-
" deformis, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
" Woodsiana, *Tate* ...	1	2	-	-	-	-	-	8	9	-	-	12
" sp.	-	-	-	-	-	-	-	-	-	-	-	[N.Z.
Rhynchonella squamosa, *Hutton*	-	2	-	4	-	-	-	8	9	N.Z	Rent.	

ECHINODERMATA.

Cidaris Australiæ, *Duncan* ...	1	-	-	-	-	-	-	-	9	-	-	-
" 2 spp.	-	-	-	-	-	-	-	-	-	-	-	-
Salenia tertiaria, *Tate*	Great Australian Bight											
" globosa, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Paradoxechinus novus, *Laube*...	-	-	3	-	-	-	-	8	9	-	-	-
Psammechinus Woodsii, *Laube*	-	-	3	-	-	-	-	8	9	-	-	-
Fibularia gregata, *Tate*... ...	-	-	-	-	-	-	-	8	9	-	-	-
Cassidulus longianus, *Gregory*...	-	-	-	-	-	-	-	-	-	-	-	-
" Australiæ, *D.* (Echinobrissus)... ...	-	-	-	-	-	-	-	-	-	-	-	-
Echinolampas posterocrassus, *Greg.*...	-	-	3	-	-	-	-	-	-	-	-	-
Echinobrissus Vincentinus, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Holaster Australiæ, *Duncan* ...	1	-	3	-	-	-	-	-	9	-	-	12
Cardiaster tertiarius, *Gregory*...	-	-	-	-	-	-	-	-	-	-	-	-
" latecordatus, *Tate* ...	-	-	-	-	-	-	-	-	-	-	-	-
Hemiaster planedeclivis, *Greg.*	-	-	-	-	-	-	-	-	9	-	-	-
Eupatagus cor-anguinum, *Tate*	-	-	-	-	-	-	-	-	-	-	-	-
Meoma decipiens, *Tate*... ...	-	-	-	-	-	-	-	-	-	-	-	-
Maretia anomala, *Duncan* ...	-	-	-	-	-	-	7	-	-	-	-	-
Astrogonium sp....	-	-	-	-	-	-	-	-	-	-	-	-
Pentacrinus sp.	N.Z.											
Antedon sp.	-	-	-	-	-	-	-	-	-	-	-	-

ZOANTHARIA.

Flabellum distinctum, *Edw. & H.*	1	-	3	-	-	-	7	-	-	-	-	-
Notocyathus australis, *Duncan*	-	-	3	-	-	6	7	8	9	10	-	-
" Aldingensis, *T. Wds.*	1	-	-	-	-	-	-	-	-	-	-	-
" Tateanus, *T. Wds.*	-	-	-	-	-	-	-	-	-	-	-	-
Bistylia adherens, *T. Wds.* ...	-	-	-	-	-	-	-	-	-	-	-	-

* Nomen mutand., T. Davidsoni, *Etheridge fils*, non *King*, 1871.

Trematotrochus fenestratus, *T. Wds.* ...	-	-	3	-	-	6	-	8	-	-	-	
" heterocostatus, *T. Wds.* ...	-	-	-	-	-	-	-	-	-	-	-	-
Amphihelia zic-zac, *T. Wds.* ...	-	-	-	-	-	-	-	-	-	-	-	-
" striata, *T. Wds.* ...	-	-	-	-	-	-	-	-	-	-	-	-
Conosmilia contorta, *T. Wds.*...	-	-	-	-	-	-	-	-	-	-	-	-
Cyathosmilia laticostata, *T. Wds.*... ...	-	-	-	-	-	-	-	-	-	-	-	-
" tenuicostata, *T. Wds.*... ...	-	-	-	-	-	-	-	-	-	-	-	-
Cladocora contortilis, *T. Wds.*	-	-	-	-	-	-	-	-	-	-	-	-
Graphularia senescens, *Tate* ...	-	-	3	-	-	-	-	-	-	-	-	-

Chapter II.

Table Cape, Tasmania.

This section has been so fully described by Johnston, "Geol. Tasm." that after a visit of inspection little can be added. But it is noteworthy that the bed richest in fossils is the basal one, or Crassatella-bed ; the overlying Turritella-bed, so called from its profusion of two small species of that genus, shows a remarkable poverty in species, while all, except the few echinoderms, are common to the Crassatella-bed. A gradual diminution in species and individuals arrests the attention as we rise in the section, so that at last the top of the Turritella-bed shows barrenness, and merges into unfossiliferous beds. No stratigraphical interruption from base to summit can be observed.

The Turritella-bed has acquired exceptional interest from the fact that it has furnished the remains of a marsupial, and therefore the most ancient as regards Australia. The study of the block stone containing this unique fossil does not permit of an explanation of its occurrence other than that of its embedment in original soft sediment.

The Table Cape section thus presents most pronounced littoral deposits, gradually merging into a lacustrine formation.

We append a list of fossils revised from that given by Mr. Johnston, and have indicated those for whose denomination we hold ourselves responsible ; and until actual comparison with the Aldinga types be made it will not be safe to accept those alleged to be in common with restricted species of the Aldingian basin.

Mr. Pritchard's paper on "Table Cape Fossils" only reached us a few days before this paper was read, so that its critical consideration is deferred ; but it may be stated that Mr. Atkinson's collection, which forms the basis of Mr. Pritchard's report, was studied and named by one of us in 1893, when on a visit to Table Cape, though it is evident that gentleman has since increased his

collection by the addition of the smaller species of Mollusca, as then urged upon him.

We catalogue 303 species from the Table Cape beds, summarised as follows:—

Zoantharia		21
Echinodermata		8
Crustacea		1
Mollusca	Palliobranchiata	18
	Lamellibranchiata	75
	Scaphopoda	3
	Gastropoda	170
	Cephalopoda	1
Pisces		4
Mammalia		2

The Polyzoa and Foraminifera are not included in our list.

Eight species of Mollusca out of the above total of 267 are recorded as still living, viz., *Rhynconella squamosa*, *Myodora brevis*, *Chamostrea albida*, *Limopsis aurita*, *L. Belcheri*, *Pectunculus laticostatus*, *Ostrea hyotis*, *Dentalium lacteum*, and the proportion of recent species is therefore 3 per cent.

By excluding *Pectunculus laticostatus* and *Limopsis aurita* from the list, for reasons subsequently given, this percentage will be reduced to 2·2.

LIST OF TABLE CAPE FOSSILS.

Being Addenda and Corrigenda to List in Johnston's Geology of Tasmania, 1888, pp. 229 et seq. ! Species studied. * Type Specimens from Table Cape.

ZOANTHARIA.

! Trematotrochus fenestratus, *T. Wds.*
Notocyathus viola, *D.*
" excisus, *D.*
Deltocyathus italicus, *Edw. and H.*
Ceratotrochus McCoyi, *D.* (fide T. Wds., R. S. T., 1876, p. 17)
Antillia lens, *D.*
! Flabellum Victoriæ, *D.*
! " pedicellare, *Tate*
* " Duncani, *T. Wds.*
! " Candeanum, *Edw. & H.* (coll. E. D. Atkinson ! F. distinctum apud Pritchard)
! Placotrochus elongatus, *D.*
! " deltoideus, *D.*
! Conosmilia anomala, D.
! " striata, *D.*
* Heliastræa Tasmaniensis, *D.*
* Thamnastræa sera, *D.*
* " Tasmaniensis, *D.*
Palæoseris Woodsii, *D.*
* ! Astrangia tabulosa, *Tate*
* ! Dendrophyllia epithecata, *D.* (syn. D. Duncani, T. Wds.)
! Balanophyllia Australiensis, *D.*

ECHINODERMATA.

Cidaris, sp.
! Echinolampas posterocrassus, *Greg.?* (Hobart Mus. ! specimens crushed or ill-conditioned)
! Eupatagus Murrayanus, *Laube?* (Hobart Mus ! specimens crushed or ill-conditioned)
Lovenia Forbesi, *T. Wds.* (coll E. D. Atkinson ! var. minor; var. Etheridgei.)
* ! Conoclypeus rostratus, *Tate* (Micraster brevistella, Hobart Mus. !)
! Fibularia gregata, *Tate*
* ! Monostychia Etheridgei, *Johnst.*
Schizaster abductus, *Tate* (coll. E. D. Atkinson.)

CRUSTACEA.

! Balanus amphitrite, *Darwin* (coll. R. M. Johnston !)

PALLIOBRANCHIATA.

* ! Terebratula vitreoides, *T. Wds.*
! " sp.
* Waldheimia Tateana, *T. Wds.*
! " Garibaldiana, *Davidson*
" furcata, *Tate*
" Johnstoniana, *Tate*
! " grandis, *T. Wds.*
" Taylori, *Eth.*
" Corioensis, *McCoy*
" pectoralis, *Tate?*
! Terebratulina Scoulari, *Tate* (coll. E. D. Atkinson !)
" catinuliformis, *Tate*
" lenticularis, *Tate?*
" triangularis, *Tate*
Terebratella Tepperi, *Tate*
* " Woodsii, *Tate*
! Magasella Woodsiana, *Tate* (coll. E. D. Atkinson !)
! RHYNCHONELLA SQUAMOSA, *Hutton*

LAMELLIBRANCHIATA.

! Aspergillum teredina, *Tate* (A. sp., coll. R. M. J. !)
! " liratum ?
! Teredo sp.
! Solecurtus Legrandi, *Tate*
! Panopaea Agnewi, *T. Wds.*
! " orbita, *Hutton* (Coll. E. D. A. !)
! Corbula ephamilla, *Tate*
! " pyxidata, *Tate*
! Zenatiopsis angustata, *Tate* (coll. E. D. A. ! Hobart Mus. ! syn. Z. fragilis, Pritchard)
! MYODORA BREVIS, *Stutchbury* (M. æquilateralis, Johnston !)
!* " australis, *Johnst.*
! Mactra Howchiniana, *Tate* (juvenile example)
! Phragmorisma anatinaeformis, *Tate*
! Psammobia aequalis, *Tate*
" Hamiltonensis, *Tate*
!* Tellina cainozoica, *T. Wds.*
! " Masoni, *Tate*, var.
!* Chione Allporti, *T. Wds.*
!* " hormophora, *Tate*
! Chione dimorphophylla, *Tate* (coll. E. D. A.!)
!* " cainozoica, *T. Wds.*
!* " propinqua, *T. Wds.*
! " multitæniata, *Tate* (coll. E. D. A. !)
! Meretrix eburnea, *Tate* (syn. M. tenuis, Pritchard, non Tate)
! " submultistriata, *Tate*
!* Dosinia Johnstoni, *Tate* (syn. D. densilineata, Pritch.)
!* Cardium septuagenarium, *Tate*
! " hemimeris, *Tate*
!* Chama lamellifera, *T. Wds.*
! CHAMOSTREA ALBIDA, *Lk.* (syn. C. crassa, Tate)
!* Lucina planatella, *Tate*
!* Diplodonta subquadrata, *Tate*
! " suborbicularis, *Tate*
!* Crassatella oblonga, *T. Wds.*
!* " var. aphrodina, *T. Wds.*
! " communis, *Tate* (syn. C. astartiformis, Tate, non Nyst)
!* Mytilicardia platycostata, *Johnston*
Carditella lamellata, *Tate*
Cardita trigonalis, *Tate*
!* " gracilicostata, *T. Wds.*
!* " Tasmanica, *Tate*
" scabrosa, *Tate* (fide Pritchard)
! Trigonia semiundulata, *McCoy*
!* Nucula Tenisoni, *Pritchard* (syn. N. tumida, T. Wds., non Hinds)
!* " Atkinsoni, *Johnst.*
!* " fenestralis, *Tate*
! Nuculana Huttoni, *T. Wds.*
! " prælonga, *Tate*
!* " crebrecostata, *T. Wds.*
! " Woodsii, *Tate*
! " apiculata, *Tate*
Arca pseudonavicularis, *Tate*
! Barbatia celleporacea, *Tate*
! " limatella, *Tate*
! Cucullæa Corioensis, *McCoy*
!* PECTUNCULUS cainozoicus, *T. Wds.*
! " LATICOSTATUS, *Q.* and *G.* ? (syn. P. McCoyii, Johnston)
! LIMOPSIS AURITA, *Brocchi* ?
! " BELCHERI, *Ads. & Rv.*

! Modiola n. sp.
! Crenella globularis, *Tate*
! Spondylus pseudoradula, *McCoy* (Hobart Mus. !)
! " gæderopoides, *McCoy* (coll. E. D. A. !)
!* Lima Bassii, *T. Wds.* (syn. L. squamosa, T. Wds.)
! Limatula Jeffreysiana, *Tate*
! " crebresquamata, *Tate*, *m.s.*
!* Limea transenna, *Tate*
! Pecten Foulcheri, *T. Wds.*
! " Hochstetteri, *Zittel*
" polymorphoides, *Zittel*
! " Yahlensis, *T. Wds.* (coll. E. D. A.!, Hob. Mus.!; P. lucens, Johnston, non Tate)
! Amussium Zitteli, *Hutton*
! Placunanomia sella, *Tate*
! Dimya dissimilis, *Tate*
! Ostrea hyotis, *Sow.*? (Hobart Mus.!)

SCAPHOPODA.

! Dentalium lacteum, *Desh.*
! Entalis Mantelli, *Zittel*
! " subfissura, *Tate* (Hobart Mus.!)

GASTROPODA.

!* Murex Eyrei, *T. Wds.*
* " Legrandi, *Johnst.*
! " velificus, *Tate* (coll. E. D. Atkinson !)
! " irregularis, *Tate*
! " camplytropis, *Tate*
! Pseudomurex sp.
! Rapana aculeata, *Tate* (coll. E D. Atkinson !)
!* Typhis McCoyi, *T. Wds.*
!* Ricinula purpuroides, *Johnst.*
!* Lampusia Abboti, *T. Wds.*
! " tortirostris, *Tate*
! " crassicostata, *Tate*
!* Epidromus tasmanicus, *Johnst.*
* Trophon Selwyni, *Pritchard*
!* Fusus Meredithæ, *T. Wds*
!* " Johnstoni, *T. Wds*
! " dictyotis, *Tate*
! " craspedotus, *Tate* (F. pagodoides, McCoy m.s., Hob. Mus. !)
! " foliaceus, *Tate* (Hob. Mus. !)
!* Clavilithes Tateanus, *T. Wds.*
! Fasciolaria decipiens, *Tate*
! Latirofusus sp.
!* Siphonalia Roblini, *T. Wds*
! Sipho n. sp.
!* Peristernia transenna, *T. Wds.*
" Aldingensis, *Tate* (fide Pritchard)
" Murrayana, *Tate*, var. (fide Pritchard)
!* " affinis, *Tate*
" semiundulata, *Pritchard* (P. rudis, Tate m.s.)
* Tritonidea minuta, *Johnston* (Murex)
!* Cominella fragilis, *T. Wds.* (Buccinum)
!* Phos liræcostatus, *T. Wds.* (Cominella)
* Pyrula altispira, *Pritchard* (coll. E. D. Atkinson !)
* Lyria semiacuticostata, *Pritchard* (coll. E. D. Atkinson)
* Voluta Agnewi, *Johnst.*
* " Allporti, *Johnst.*
!* " McCoyi, *T. Wds.*
* " lirata, *Johnst.*
* " Stephensi, *Johnst.*
* " pellita, *Johnst.*
* " Tateana, *Johnst.*
" anticingulata, *McCoy* (V. antiscalaris, "Geol. Tasm.," t. 30, f. 5)
" antiscalaris, *McCoy* (coll. E. D. Atkinson !)
* " strophodon, *McCoy*
" ancilloides, *Tate*
" Mortoni, *Tate*
* " Weldii, *T. Wds.*
" Halli, *Pritchard*
" Spenceri, *Pritchard*
" Atkinsoni, *Pritchard*
* Mitra anticoronata, *Johnst.*
!* " dictua, *T. Wds.*
" n. sp. (aff. M. othone, T. Wds.)
* Marginella Wentworthi, *T. Wds.*
* " strombiformis, *T. Wds*
* " octoplicata, *T. Wds.*
* Erato duplicata, *Johnst.*
" minor, *Tate?*
! Ancillaria hebera, *Hutton* (A. mucronata, T.-Wds., Johnston, non Sow.)
! " pseudaustralis, *Tate* (coll. E. D. Atkinson!)
!* Columbella Oxleyi, *T. Wds.*
!* " cainozoica, *T. Wds.*
!* Cancellaria Etheridgei, *Johnst.*

* Terebra simplex, *T. Wds.*
!* " additoides, *T. Wds.*
* prægracilicostata, *Pritch.*
!* Surcula Johnstoni, *T. Wds.*
!* " paracantha, *T. Wds.*
!* " pullulascens, *T. Wds.*
* " Wynyardensis, *Pritch.*
!* Drillia sandleroides, *T. Wds.*
* " crenularoides, *Pritch.*
! " n. sp.
* Daphnella cancellata, *T. Wds.*
!* " columbelloides, *T. Wds.*
!* " gracillima, *T. Wds.*
!* " tenuisculpta, *T. Wds.*
! Mangilia, n. sp.
! " n. sp.
! " n. sp.
* Mangilia (?) gracilirata, *T. Wds.* (Hobart Mus.)
!* Thala (?) marginata, *T. Wds.*
Conus complicatus, *Tate* (coll. E. D. Atkinson !)
!* Cypræa Archeri, *T. Wds.*
! " subsidua, *Tate*
!* " eximia, *G.B.S.* (coll. E. D. Atkinson !)
" platypyga, *McCoy* (coll. E. D. Atkinson !)
" consobrina, *McCoy* (coll. E. D. Atkinson !)
" platyrhyncha, *McCoy* (Hob. Mus. !)
" ovulatella, *Tate* (fide Pritchard)
" sphaerodoma, *Tate* ? (fide Pritchard)
" leptorhyncha, *McCoy*
! Trivia avellanoides, *McCoy*
!* Semicassis sufflata, *T. Wds.* (syn S. transenna, Tate)
! Cassidaria gradata, *Tate* (C. reticulospira, McCoy, m.s. in Hob. Mus !)
! Natica subNoæ, *Tate*
!* " polita, *T. Wds.*
!* " vix-umbilicata, *T. Wds.*
!* " Wintlei, *T. Wds.*
! Calyptræa subtabulata, *Tate.* (Trochita calyptræformis, syn. Pileopsis navicelloides)
!* Calyptropsis umbilicata, *Johnst.*
!* Crepidula Hainsworthi, *Johnst.*
!* Scalaria inornata, *Tate*
! " foliosa, *Tate*
! Crossea princeps, *Tate*
! " sublabiata, *Tate*
!* Turritella Sturtii, *T. Wds.*
!* " Warburtoni, *T. Wds.*
!* Turritella tristira, *Tate*
!* " Murrayana, *Tate*
" conspicabilis, *Tate* (fide Pritchard)
!* Tenagodes occulusus, *T. Wds.*
!* Thylacodes conohelix, *T. Wds.*
! " rudis, *Tate*
* Odostomia Roberti, *T. Wds.*
* " polita, *Johnst.*
* " microlirata, *Johnst.*
!* " puteolata, *Pritchard* (Actæon)
* Pyramidella sulcata, *Johnst.*
! " n. sp.
* Turbonilla pagoda, *T. Wds.*
* " liraecostata, *T. Wds.*
!* Eulima (Leiostraca) Johnstoniana, *Tate*
! Newtonia n. sp.
!* Bittium Johnstoni, *T. Wds.* (Rissoina and Cerithiopsis)
!* Potamides semicostatum, *Tate*
!* " Wynyardense, *Tate*, (nom. mut. syn. P. pyramidale, Tate non ——)
* Rissoina concatenata, *T. Wds.*
! " Mulderi, *Tate*
! " n. sp.
* Rissoa Stevensiana, *T. Wds.* (R. dubia, Johnst. is the tip of turretted shell of uncertain genus)
!* " Tateana, *T. Wds.* (Rissoina)
!* " varicifera, *T. Wds.* (Rissoina)
! " 3 n. spp.
! Torinia Simsoni, *Tate, m.s.*
* Adeorbis lævis, *Johnst.*
* Liotia lamellosa, *T. Wds.*
!* " Roblini, *T. Wds.*
!* Delphinula gibbuloides, *T. Wds.* (Torinia ; Hobart Mus. !)
* " tetragonostoma, *T. Wds.*
* " imparigranosa, *Pritchard*
!* Turbo Etheridgei, *T. Wds.*
* " Atkinsoni, *Pritchard*
!* Astralium Flindersi, *T. Wds.*
!* " ornatissimum, *T. Wds.*
!* " crassigranosum, *T. Wds.* (Gibbula)
* " Hudsoniana, *Johnst.* (syn. A. Johnstoni, Pritchard)

* Trochus Josephi, *T. Wds.*
!* Gibbula æquisulcata, *T. Wds.*
* " Clarkei, *T. Wds.*
!* " crassigranosa, *T. Wds.* (part, junior)
* Calliostoma atoma, *Johnst.*
* " Tasmanica, *Johnst.*
* " Blaxlandi, *Johnst.*
* " latecarina, *Pritch.*
!* Cantharidus alternatus, *T. Wds.* (Thalotia)
!* Euchelus Woodsii, *Johnst.*
!* Margarita Keckwicki, *T. Wds.*
Fissurellidæa malleata, *Tate*
!* Emarginula transenna, *T. Wds.*
* Tugalia crassireticulata, *Pritch.*
Haliotis ovinoides, *McCoy* (fide Pritchard)
! Actæon scrobiculatus, *T. Wds.*
!* Ringicula lactea, *Johnst.*
!* Cylichna Woodsii, *Tate*
! " sp.
! Volvulella sp.
! Atys sp.

CEPHALOPODA.

Aturia australis, *McCoy*

PISCES.

Carcharodon angustidens, *Ag.*
Oxyrhina trigonodon, *Ag.*
Lamna elegans, *Ag.*
! Mylobates plicatilis, *Davis*

MAMMALIA.

!* Zeuglodon brevicuspidatus, *Tate*
Diprotodontoid marsupial (Hobart Mus.!)

Chapter III.

General Remarks—Horizons of the Eocene.

Regarding the main divisions of the Tertiary deposits of Southern Australia into Eocene, Miocene, and Pliocene there is little difficulty, the palæontological being confirmed by the stratigraphical evidence. The two latter groups are of comparatively limited development in the province, but the first named, besides being spread over a wide area, shows such variation in the faunal contents of the beds as to render their correlation no easy task. In our previous papers we have treated the Eocenes as a whole, without attempting further subdivision, the simple reason being that no satisfactory basis of classification presented itself.

That the beds in question are of Eocene age was discussed fully in Part I., and it may be added here that on this point there is unanimity among all observers who have given adequate attention to the subject. The chief argument relied on is the proportion of recent molluscan species, which nowhere exceeds $3\frac{1}{2}$ per cent. As a fact the percentage is usually under 2, the only exception being in the Table Cape section with a record of from 2.2 to 3 per cent. of living species, so that a margin is left for what further researches may possibly disclose. In some beds the percentage is less than 1, and in others between 1 and 2, but it would be extremely unwise, as well as contrary to the practice of geologists, to form conclusions as to relative age on such minor variations as these, since they may depend upon the number of species collected, or upon other causes which need not be cited. As a convenient, though admittedly rough, means of classifying Tertiary strata, the percentage system may serve for distinguishing their broad divisions, but must necessarily fail when applied to the discrimination of minor zones of deposition, where the recorded variation does not exceed 1 or 2 per cent.

The actual number of species common to the respective beds can as yet be estimated approximately only. It is true that much material is on hand, the ranks of collectors having been strongly reinforced of late years, but as the critical examination of the Pleurotomidae, Trochidae, and some other families is but little advanced, the published lists are necessarily defective. Additional identifications are frequently made, but pending an opportunity for publishing they may remain in manuscript for a long time. The observations made in this and former papers are based upon the published lists as revised to date by our manuscript additions and corrections. We should be glad if these latter could be printed herewith, but there is a limit, not only to the time at our disposal, but also to the space allowed us in the Society's Transactions, and it must suffice to say at present that we shall take the earliest opportunity of furnishing revised tables of fossils.

By far the most prolific Eocene deposit in Australia is that at Muddy Creek with 649 species of mollusca, and, as might be expected, representatives of many of them are found in all the beds. At Spring Creek, out of a total of 320 molluscan species on our lists, 127, or 40 per cent., occur also at Muddy Creek. In their latest paper*, Messrs. Hall and Pritchard credit us with admitting that there are two zones on the Spring Creek cliffs, but, as a fact, we purposely abstained from expressing a decided opinion on the matter until fuller investigations had been made. Our remarks are too long for quotation, but their meaning is clear enough from the concluding words, which are as follows :—"We offer the *suggestion* that at this level, and above the echinoderm rock, a minor zone of the Eocene *may possibly* be demonstrated—at any rate the matter is worthy of further research." Our doubts as to the existence of two zones at Spring Creek are increased rather than diminished by the list of fossils quoted by these authors from the upper clays.

Amongst the 105 species enumerated from the clays, 40, or 38 per cent., are represented at Muddy Creek, and for the sake of comparison we will make a similar calculation for the species of the so-called lower beds. Seven species are recorded by us as confined to the strata overlying the echinoderm rock†, and deducting these from our total of 320 species for the general section, 313 are left as proper to the inferior strata, of which 124 are Muddy Creek species, giving a proportion of 40 per cent., which indicates a higher proportion of Muddy Creek shells in the lower than in the upper zone. And yet we are asked to believe that of these two zones it is the upper one which is more nearly allied to the Muddy Creek bed! We

* Remarks on the proposed subdivision of the Eocene Rocks of Victoria. Proc. Roy. Soc., Vic., 1896.

† Correlation, &c., Pt. II., p. 119.

may add that we do not accept all the species noted by Messrs. Hall and Pritchard as restricted (for Spring Creek) to the upper clays, two or three of them having been found by us in the basal beds also. If there are really two zones at Spring Creek they must be very minor ones, the variations in their faunas being slight, and further collecting from both is advised before announcing definite conclusions as to their import.

For the fossils of the Lower Maud beds the same authors claim a similarity to those from Spring Creek, but we are unable to trace any special affinity between the two faunas. Their revised table of Maud fossils, just received,* contains only 37 species of mollusca, but a collection made at the section by Mr. Mulder and one of us gives a total of 66. Of these, 33 species are represented at Muddy Creek, and 23 at Spring Creek, but 18 of the latter are also included amongst the Muddy Creek representatives. Of the five Spring Creek shells remaining, none are special to that section, and occur also in one or other of the extra-limital deposits. At least six of the species obtained by us are new and apparently restricted to this small exposure. The names and distribution of the Maud fossils on our list will be found in Appendix I.

At a higher level, and therefore probably overlying the fossiliferous strata, an outcrop of basalt is visible, which by the Survey is mapped as Older Volcanic. Messrs. Hall and Pritchard, in speaking of it, say, "there is, we now think, not sufficient evidence to suggest a subdivision of the volcanic rock,"† which means that they regard the Maud basalt as the equivalent of that which underlies the marine Eocenes of Flinders and Eagle Rock. We do not pretend to say without a fuller study of the Maud section whether this is the case or not, though the reported relations of the igneous rock to the accompanying sedimentary strata would lead to a different conclusion. Below the shell-beds, or littoral deposit, a polyzoal limestone appears, which, though of considerable thickness and easily separable from the overlying sandy beds, is not mentioned by Messrs. Hall and Pritchard in either of their papers. We have picked out pectens and other fossils from it, and observe that they are the ordinary ones yielded by such strata. Polyzoal limestone is also said to rest upon the Maud basalt, but the significance of this has yet to be worked out. The list of fossils from the Upper Maud beds given by Messrs. Hall and Pritchard cannot be appealed to, since most of the gastropods, it is stated, come from a deposit overlying polyzoal limestone, some miles distant. In their first paper great prominence was given to the argument that the Upper Maud and Waurn Ponds beds lie on the same horizon, and a comparative table of fossils was supplied to demonstrate their close affinity. In the lately

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* *Op. cit.*

† Older Tertiaries of Maud, &c. Proc. Roy. Soc., Vic., 1895.

issued article this view is entirely withdrawn, and with it, we presume, the interpretation placed upon the fossil evidence, since we are now told that the former deposit is younger than the latter; in fact, we are led to infer that, like the Spring Creek beds with which they are finally correlated,* the Waurn Ponds limestones are overlain by the Older Basalt. Now, these limestones do lie immediately beneath basalt, but Messrs. Hall and Pritchard will certainly not contend that it is the older flow, as it covers also adjacent Eocene beds, which they still consider the youngest in the series. There is undoubted Older Basalt beneath the Eocene of Curlewis, a few miles from Waurn Ponds, and if it were present at the latter locality, which is apparently not the case, might we not also expect it to underlie the fossiliferous strata?

An exceedingly instructive outcrop of the Eocene has lately been worked at Birregurra by Mr. Mulder,† to whom we are indebted for examples of most of the fossils collected. Taken as a whole, the fauna belongs to the Muddy Creek type, but, curiously enough, includes also several species recorded hitherto only from Spring Creek, Table Cape, Cape Otway, or Aldinga Bay, amongst which may be quoted *Ancillaria ligata*, *Cancellaria Etheridgei*, *Voluta anticingulata*, *V. Halli*, *Isapis eothinos*, *Cavditella lamellata*, *C. radiata*, *Cardium pseudomagnum*, *Chione Pritchardi*, *C. multitæniata*, *Dosinia Johnstoni*. This intermingling in one section of shells usually considered to be characteristic of diverse faunas has an important bearing upon the correlation of the Eocenes, as will be seen in the sequel.

The beds at Shelford have so far yielded 201 species of mollusca, of which 143 occur also at Muddy Creek. The Schnapper Point and Bairnsdale deposits are probably of the same type, but the catalogues of species from them are too imperfect to allow of definite comparisons. The majority of the fossils in the Geelong beds (including Western Beach, Lower Moorabool, Curlewis-Belmont, and one or two others) are recorded also from Muddy Creek, while, though Spring Creek is in closer proximity to them than to the Birregurra section, they contain fewer representatives of its fauna. A possible explanation may be that, notwithstanding the greater distance, the configuration of the coast in Eocene times was such as to offer less obstruction to the migration of species between Spring Creek and Birregurra than between the former locality and Geelong.

Community with the fauna of Muddy Creek also obtains in the gastropod-bed of the Murray River, near Morgan, though the distance is so great.

Two of the most interesting deposits remain to be mentioned viz., those at Cape Otway and at the Gellibrand River, both on

* *Op. cit.* Summary, page 166.

† Catalogue of Fossils from Birregurra, Geelong Naturalist, April, 1896.

the south coast of Victoria, and only about 25 miles apart, but nevertheless showing a most marked difference in their respective faunas. Out of 265 species of mollusca from the Gellibrand, 216, or 80 per cent., occur also at Muddy Creek, while of the 123 species recorded for Cape Otway, 44, or only 36 per cent., are Muddy Creek shells. On the other hand, 40 of the Cape Otway species, or one-third of the whole, are represented in the distant Aldinga section, while 18 of them are restricted to these two sets of beds. Though so close together, the outcrops of the Gellibrand and Cape Otway contain only 30 species in common! It may be added that lithologically they are alike, the strata in each locality consisting of mound-like masses of black mud, while both are similarly overlain by a Pleistocene rock. The Otway Eocenes are certainly underlain by mesozoic strata, but at the Gellibrand these suddenly disappear close to Pebbly Point, and are not met with again to the west on either the Victorian or South Australian coast. The proportion of recent species in the two deposits is practically identical, but owing to the comparatively small number of mollusca collected at Cape Otway, no special significance is attached to this circumstance. In Part II, when referring to the discordant facts of distribution disclosed in these sections, we said that the most reasonable explanation was that the beds were on different horizons. Corroborative stratigraphical evidence certainly cannot be adduced, but then the coastline between the two localities has not been closely examined. As will be seen, however, in the succeeding observations there are good grounds for deeming our previous conclusion correct.

From the great similarity between the Gellibrand and Muddy Creek fossils, we may infer a coastal connexion between the localities during the era of deposition. As was shewn in Part I, the beds are in reality continuous between the two areas. Farther west, between Portland and Muddy Creek a similar continuity of the Eocenes beneath a covering of basalt was pointed out some years ago.* Outcrops of the same strata are visible also on the banks of the Glenelg River for fully 100 miles from its mouth, while in the County of Follett, from the sea coast as far as Apsley, and in the adjoining South Australian territory, from Mt. Gambier to Narracoorte and Border Town, the existence of Eocene deposits containing a similar type of fauna is abundantly revealed by numerous fossiliferous caves, as well as by the fossils obtained wherever wells have been sunk. That this whole region was thus one of practically contemporaneous deposition during the Eocene period will hardly be questioned. The resemblance of the fauna of the Murray River in South Australia, and of Shelford, Geelong, &c., in Victoria, to that of the same area has been already alluded to.

*Notes on the Muddy Creek beds, &c. Trans. Roy. Soc., S.A., 1888.

If we now examine the Eocene strata of Aldinga (and Adelaide) in the St. Vincent Gulf area of South Australia we observe, as shewn in the Table of Fossils published herewith, that amongst many of the old familiar Muddy Creek forms, a large number of new ones make their appearance—to such an extent, indeed, is this the case that the two faunas are really in marked contrast. Compared with the wide spread fauna of the Muddy Creek Eocene, that of Aldinga, as a whole, is much more restricted geographically, as, except at Cape Otway, few of its characteristic fossils are present in other deposits. From this fact alone it might perhaps be inferred that the Aldingian is the older of the two contrasted faunas, remnants of it only having survived to a later period. The recent discoveries made by Mr. Edwd. Clark, B.Sc., in the Ninety-Mile Desert of South Australia, already alluded to, and which are published in the present issue of the Society's Transactions tend to confirm this view. Having been allowed by the courtesy of the author to peruse the manuscript of his article we have little doubt concerning the correctness of his conclusions, viz., that in all probability the inferior beds of Aldinga (and Adelaide) underlie the Mount Gambier and Murray River limestones, and consequently therefore the deposits we have correlated with them at Muddy Creek.

Amongst the various Eocene beds hitherto examined those at Muddy Creek and Aldinga exhibit the greatest diversity in their faunas, as, though they contain many species in common the restricted ones are specially numerous. Both have been well examined and may be regarded as typical representatives of the older and younger faunas respectively, with which, therefore, other Eocene sections can be well compared. With the notable exception of Cape Otway, the Muddy Creek type of fauna is conspicuous in most of the Victorian Eocene sections, that of Aldinga being feebly represented. The same remark applies to the Murray beds in South Australia, and also to those at Table Cape in Tasmania. In the case of some of the best known sections, the relative representation of the Aldingian fauna can be approximately estimated, and it is curious to note that the percentage of characteristic Aldinga shells present in them seems to decline from Cape Otway to Table Cape, Spring Creek, and Geelong, and thence westward to Birregurra, Camperdown, and Gellibrand R., along a former strait or channel, which, as will be shown later on, existed in the old Eocene sea.

Our estimate is arrived at by taking account of those Aldingian shells which have not so far been recorded from Muddy Creek, though they are represented in one or other of the intermediate outcrops. Only well authenticated species can be quoted, which, according to our records, number 46. The distribution of these is shown in the following table :—

Fossils in Aldinga Bay or Adelaide sections, not collected at Muddy Creek but occurring in other localities.	DISTRIBUTION.							
	Cape Otway.	Spring Creek	Table Cape.	Western Beach, Geelong.	Lower Maud.	Birregurra.	Camperdown	Gellibrand.
Murex calvus	*	-	*	-	-	-	-	-
" bifrons	*	-	-	-	-	-	-	-
" prionotus	*	-	-	-	-	-	-	?
" hypsellus	*	-	-	-	-	-	-	-
" sublævis	-	*	-	-	-	-	-	-
Triton cribrosus	*	-	-	-	-	-	-	-
Clavalithes incompositus ...	*	-	-	-	-	-	-	-
Voluta cribrosa	*	-	-	-	-	-	-	-
Ancillaria ligata	-	*	-	*	-	*	*	-
Cancellaria ptychotropis ...	-	*	-	-	-	-	-	-
Cypræa ovulatella	*	-	-	-	-	-	-	-
Erato pyrulata	*	-	-	-	-	-	-	-
" australis	-	*	-	-	-	-	-	*
Scalaria pleiophylla	-	*	-	*	-	-	-	-
Torinia Simsoni	*	*	*	-	-	-	-	-
Turritella Aldingæ	*	-	-	*	-	-	-	-
Mesalia stylacris	*	-	-	-	-	-	-	-
Mathilda bicarinata	-	*	-	*	-	-	-	-
Lovenella triserrata	*	-	-	-	-	-	-	-
Triploca ligata	*	-	-	-	-	-	-	-
Bulimella callosa	*	-	-	-	-	-	-	-
Pecten Peroni...	-	?	-	-	-	-	-	-
" consobrinus, var. ...	-	*	-	*	*	-	-	-
" Hochstetteri *(a)* ..	-	*	*	-	-	-	*	-
Limopsis insolita	*	*	-	-	*	*	-	-
Dimya sigillata	-	*	-	*	-	-	-	-
Limatula polynema	-	*	-	-	-	-	-	-
Spondylus gæderopoides *(b)*	-	*	*	-	-	-	-	*
Modiola sp. (aff. albicostata)	-	*	*	-	-	-	-	-
Leda leptorhyncha	*	-	-	-	-	-	-	-
Arca pseudo-navicularis ...	-	-	* †	-	-	-	-	-
Barbatia limatella	-	-	*	-	-	-	-	-
Mytilicardia alata	-	*	-	-	-	-	-	-
Carditella radiata	*	*	-	-	-	*	-	-
" lamellata	-	-	* †	-	-	*	-	-
Chione multitæniata... ...	*	*	*	-	-	*	-	-
Cytherea tenuis	*	*	-	-	-	-	-	-
Myodora lamellata	*	-	-	-	-	-	-	-
Corbula pyxidata *(c)* ...	*	*	*	-	*	*	-	*
Aspergillum teredina ...	-	*	*	-	-	-	-	-
Waldheimia furcata *(d)* ...	*	-	* †	-	-	?	-	-
" pectoralis ...	-	-	* †	-	-	-	-	-
" Johnstoniana ...	-	*	-	-	-	-	-	-
Terebratulina triangularis ...	*	-	* †	-	-	-	-	-
" lenticularis *(e)*	-	-	* †	-	-	-	-	-
Terebratella Tepperi ...	-	-	* †	-	-	-	-	-
Total species of Mollusca collected in each bed ...	123	320	267	109	66	165	91	265
Per centage distribution of typical Aldinga species...	19·5	6·9	5·6	4·6	4·5	4·2	2·2	1·5

Other Occurrences :—*(a)* R. Murray ; *(b)* Bairnsdale ; *(c)* Cheltenham, Schnapper Point, Shelford, Moorabool Valley, Curlewis ; *(d)* ? Curlewis, Upper Maud ; *(e)* Geelong, R. Murray.

† Quoted on the authority of Mr. R. Johnston.

The species here enumerated are thus survivors of the more ancient fauna found intermingled with those characteristic of the later one, and where in any section the proportion of them is considerable, as at Cape Otway, its relatively low position in the Eocene series is probably indicated. For Spring Creek, Table Cape, &c., where the percentage of such forms is comparatively small, we hesitate to express a decided opinion, and prefer to wait for further evidence. In the absence of stratigraphical evidence, the subdivision of the Eocenes on palæontological grounds must be attempted with caution, the horizons apparently merging very gradually. It is quite possible that, like numerous other species known to be common to the whole series, some at least of those here tabulated may have existed continuously through the earlier and later periods. That they are either absent or sparingly represented in a particular deposit may depend upon other conditions, and notably of course upon geographical distance along the ancient coast line.

We may safely affirm that a widely different arrangement of the land and water areas formerly obtained in the Southern Ocean. To the north of Cape Otway there is an elevated region showing Mesozoic rocks only, which must have been either an island or a peninsula during the Eocene period, there being at Birregurra, Inverleigh, Shelford, Geelong, &c., on its northern margin a valley in which, as previously mentioned, deposits of the marine Eocenes occur. This valley extends to Port Phillip Bay and Western Port, where the high lands of the Gippsland Mesozoics intervene between the Tertiaries just mentioned and those in the east of the colony. That the Cape Otway ranges were separated from the mainland during the Tertiary period is an opinion advanced both by Mr. F. M. Krausé* and Mr. R. Murray. The latter gentleman further concludes that a strait formerly connected Port Phillip Bay with Warrnambool and Portland.†

On the coast line to the west of the Gellibrand River section no strictly littoral deposit of the Eocene is known either in Victoria or the Mount Gambier area of South Australia, the outcrops showing mostly deeper sea forms. These are invariably of the younger type, the older beds being apparently entirely absent. The great thickness of the newer Eocene in this region is well illustrated by bores lately put down in the strata at Portland, which failed to pierce them at a depth of 2,265 feet! The idea was to reach the Mesozoic strata, which were supposed to underlie the limestone, in the hope of finding a coal seam. Most probably neither the Mesozoic nor the older Eocene ever existed in the locality.

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* Geol. Surv. of Victoria. Prog. Rep. No. 1, page 101.

† Geology and Phys. Geography of Victoria, pp. 120-1-2.

Allusion has already been made to the presence of restricted species in many of the sections. A distinction should be made in this respect between the molluscan beds and those containing mostly deeper sea forms, as it is from the former that such species have been principally recorded. The latter consist chiefly of limestones and polyzoal rocks, and the suddenness with which these occasionally replace the more littoral deposits has been frequently remarked upon. The relation of the two sets of strata is often puzzling, and they have, in fact, been arranged by separate authors in exactly reversed sequence. At Muddy Creek, as well as on the Glenelg and Murray Rivers, the shell beds merge rapidly into polyzoal rock, and their contemporaneous deposition is thus scarcely open to doubt. Close to Geelong the evidence is conflicting, since, though both classes of strata alternate, the limestone underlies at Belmont and in the Lower Moorabool, while higher up the same river, in the Maud section previously referred to, a thin littoral deposit rests upon one polyzoal rock, and is said to be overlain by another, with basalt intervening. At Spring Creek, however, which is 13 miles south of Geelong, our observations certainly indicate a contemporaneous origin for the two sets of strata. In this section the restricted forms are numerous, which fact alone seems to point to its comparative isolation during the era of deposition, or, in other words, to its separation from the neighbouring land by tolerably deep water, the result being a colony or minor region of molluscan life, in which specialised forms might be expected to occur.

It must not be forgotten that the great bulk of the Australian Eocenes consists of these polyzoal rocks and limestones, with their deeper sea fauna, and when in the midst of them, species peculiar to the laminarian or littoral zone suddenly appear, it is difficult to resist the conclusion that the latter were deposited on the shores of an island. When older rocks are elevated above the adjoining Tertiaries, as is the case at Geelong, on the south coast of Victoria, in the valley of the Glenelg, and elsewhere, we may safely decide that they represent either islands or peninsulas in the ancient seas, and the occasional presence of restricted species among the ordinary ones perhaps demands no further explanation.

In the foregoing observations we have confined ourselves to broad outlines only. Many matters of detail, which naturally suggest themselves, cannot be discussed until our knowledge of the Tertiary areas is greatly increased. The questions raised, though deeply interesting, are confessedly difficult, and will perhaps not be finally settled for many years to come.

APPENDICES.

I.

Table of Lower Maud Fossils.

(Collected by Messrs. Dennant and Mulder.)

Name of Species.	Muddy Creek.	Spring Creek.	Other Occurrences (Verified by the Authors.)
GASTROPODA.			
Pseudovaricia mirabilis, *Tate* ...	*		
Natica varians ? *Tate*	-	-	Mioc. Muddy Creek, Gippsland.
" polita, *Ten. Wds.* ...	*	*	
Scalaria n. sp. (aff S. echinophora			
Turritella gemmulata, *Tate* ...	*	*	
" acricula, *Tate*, var. ...	*	-	Western Beach, &c.; Mioc. Gippsland.
Thylacodes conohelix, *Ten. Wds.*	-	*	Gellibrand ; Lower Moorabool ; Table Cape.
" crateriusculus, *Tate*	*	-	Fyansford.
Tenagodes occlusus, *Ten. Wds.*...	*	*	
Rissoa sp.	*	*	
Liotia Roblini, *Ten. Wds.* ...	*	*	
Phasianella sp.	*	-	Also Mioc. Muddy Ck.
Turbo sp.	*		
Astralium ? sp.			
Collonia tæniata, *Tate*, *m.s.*, (new sp.)			
Gibbula 2 spp.			
Thalotia exigua, *T. Wds.* ...	*		
" sp.			
Cantharidus, sp.	?		
Euchelus sp.			
Clanculus sp.	*		
Eumargarita new sp. (aff. E. strigata)			
" sp.			
Solariella sp.			
Pleurotomaria ? sp.			
Emarginula sp. (aff. E. transenna)	*		
" sp.	*		
Chiton sp.			
Ringicula sp.			
Bulimella paucilineata, *Tate m.s.*	*	*	
Utriculus sp.	*		
SCAPHOPODA.			
Entalis subfissura, *Tate*	*	*	

Name of Species.	Muddy Creek.	Spring Creek.	Other Occurrences (Verified by the Authors.)
LAMELLIBRANCHIATA.			
Teredo sp.			
Corbula pyxidata, *Tate*	-	*	Gellibrand ; Moorabool Valley, &c.
Myodora tenuilirata, *Tate* ...	*	*	
Tellina n. sp. (aff. T. porrecta) ...			
" n. sp.	*		
Donax Dixoni, *Tate*	*	*	
Chione cainozoica, *Ten. Wds.* ...			
" sp. (juv.)		*	
Dosinia Johnstoni, *Tate*			Birregurra ; Table Cape ; Mioc., Muddy Creek.
Chama lamellifera, *Ten. Wds.* ...	*	*	
Lucina leucomomorpha, *Tate* ...	*	*	
" projecta ? *Tate* (juv.) ...	*	*	
Mysia crepidulæformis ? *Tate m.s.*	*		
" sp.			
Mylitta sp.			
Cardita Maudensis, *Pritchard*			
" scabrosa, *Tate*	*	-	Western Beach ; R. Murray.
Trigonia intersitans, *Tate* (1) ...	-	-	Murray desert, Mioc. ?
Barbatia crustata ? *Tate*	*	-	Mioc., R. Murray.
" sp.			
Fossularca n. sp.			
Pectunculus cainozoicus, *Ten. Wds.*	*	*	
Limopsis insolita, *Sow.*	-	*	Birregurra ; Aldinga.
" Belcheri (Ad. & R.), *McCoy*	*	*	
Cucullæa Corioensis, *McCoy* ...	*	*	
Dimya dissimilis, *Tate*	*	*	
Lima Bassii, *Ten. Wds.*	*		Gellibrand ; Mornington.
Pecten consobrinus, *Tate*, var. ...	-	*	Mioc , Aldinga.
" Foulcheri, *Ten. Wds.* ...	*	*	
Anomia ? sp.			
Ostrea sp.			
BRACHIOPODA.			
Waldheimia grandis, *T. Wds.* ...	-	-	Glenelg R.; R. Murray ; Table Cape.
Magasella compta, *Sow*	*	*	
Crania quadrangularis, *Tate* ...			Waurn Ponds.
CRUSTACEA.			
Scalpellum sp.			
ECHINODERMATA.			
Monostychia australis, *Laube.* ...	-	*	R. Glenelg ; R. Murray.
Echinus sp.			
Scutellina patella, *Tate*	*	*	
Fibularia gregata, *Tate*	*	-	R. Murray ; Aldinga.
" " var.			

(1) Nomen mut., T. Tatei, Pritchard, non Holub & Neumayr, 1882.

Name of Species.	Muddy Creek.	Spring Creek.	Other Occurrences (Verified by the Authors.)
ZOANTHARIA.			
Placotrochus elongatus, *Dunc.* ...	*	*	
Notocyathus australis, *Dunc.* ...	*	*	
" excisus, *Dunc.* ...	*	*	
" sp.			
Deltocyathus italicus, *Edw. & H.*	-	*	R. Murray; Gellibrand; C. Otway; Rec., Sth. Aust.
Ceratotrochus typus, *Seq.* ...	-	-	Gellibrand; Fyansford.
Conocyathus sp.			
Sphenotrochus n. sp.			
Trochocyathus? sp.			
Cycloseris sp.			
Balanophyllia sp.			
Dendrophyllia? 2 spp.			
Graphularia senescens, *Tate*	-	*	Cheltenham; Crawford R.

II.

Messrs. Hall and Pritchard, in their latest paper, give a list of Eocene species at Muddy Creek recorded as living, which requires correction.

According to our records, the Eocene species at Muddy Creek passing to Recent are:—

1. Rhynconella squamosa, *Hutton.* Comparison of actual specimens has yet to be made.
2. Ostrea hyotis, *Linn.* The identification awaits corroboration.
3. Limopsis Belcheri, *Ad.* and *R.*
4. Crepidula unguiformis, *Lam.*
5. Capulus Danieli, *Crosse*
6. Hipponyx antiquatus, *Linn.* (H. foliaceus, *Q.* and *G.*).
7. Dentalium lacteum, *Deshayes.* The fossil has not yet been compared with the recent shell.

Pectunculus laticostatus, Q. and G., so called, of the Eocenes of Tasmania and Southern Australia, is, in our judgment, a distinct species, and should be quoted as *P. McCoyii*, Johnston, though the differential characters relied upon by its author are based on misconception.

Limopsis aurita, McCoy, is not the European species, *fide* Cossmann.

Saxicava arctica, Linn. The prominent and spinulose posterior angle may indicate a distinct species from the living one, but a decision thereon must await further material, that already possessed being inadequate.

Nucula tumida, Ten. Wds., is not acknowledged as a recent species.

Placunanomia Ione, Gray. Messrs. Hall and Pritchard claim this as an Eocene species on our authority, and quote it as being so noted on page 20 of Dennant's "Notes on the Muddy Creek Beds." They are mistaken. It is there marked Y, which indicates the upper beds.

III.

We desire to acknowledge the scientific candor with which Messrs. Hall and Pritchard have withdrawn some of their conclusions concerning the classification of the Eocenes in deference to the arguments advanced by us.

These authors, however, take exception to our figures regarding the number of species at Muddy Creek and Spring Creek respectively which pass up into the Miocene, and give others which, as they say, differ widely from those quoted. In reference to this matter we remark (1) that rare forms, or those concerning which there was likely to be a difference of opinion, were intentionally omitted; and (2) that the figures furnished by Messrs. Hall and Pritchard for Muddy Creek are apparently mainly derived from the 1888 list, which now needs considerable revision. In this connection we may also observe that a few minor errors appear in the distribution assigned to certain Muddy Creek species described in the Society's Transactions, which are hereby corrected as follows:—*Zenatiopsis angustata*, *Strigilla australis*, *Carditella polita*, *Mitra sordida*, *M. conoidalis* have been collected from the upper beds only; and *Chama lamellifera*, *Hinnites Corioensis*, *Hipponyx antiquatus* from the lower only. It may also be noted that *Nassa Tatei* is a derived shell in the Miocene, while, as the text shows, *N. crassigranosa* belongs to the upper deposit, the junction beds in which it was found, sparingly mixed with Eocene species, being partly remade ground.

By including the omitted species referred to, our quoted number of Eocene shells which pass up into the Miocene is thereby increased to 36 for Spring Creek and 46 for Muddy Creek; and taking Messrs. Hall and Pritchard's estimated total of 326 species for the former, and our own of 649 for the latter, the calculations show that the case was in reality understated by us, the revised figures giving 10·1 per cent. of Miocene shells present in the Spring Creek Eocenes, as against 7 per cent. in those of Muddy Creek. A list of these species will be given subsequently. It is withheld just now, pending an opportunity for consultation concerning the distribution of a few Muddy Creek fossils.

In our estimate we have taken account of those Eocene forms only which pass up to the Miocene, but we freely admit the propriety of extending the inquiry to the Pliocene, viz., to the Dry Creek and Limestone Creek beds.

INDEX TO SIGNS
Archaean
Grits, rotten slates and ferric oxide in bands.
Older Tertiary.
Drifts.
Blown sand.
Alluvium.
N
GULF ST. VINCENT
ALDINGA BAY
Snapper Point
PORT WILLUNGA
Jetty
Blanche Point
Torlachlan
MASLIN BAY
PEDLARS CK
PORT ONKAPARINGA
PORT NOARLUNGA
CASTLETON
SELLICKS HILL
KINGSTON
To Adelaide

Note on a Genus of Gryllidæ, New for South Australia; and Description of a New Species of Myrmecophila.

By J. G. O. Tepper, F.L.S., &c.

[Read June 2, 1896.]

The Myrmecophilides form a tribe of the family of the Gryllidæ, or Crickets, and are divided by M. Saussure into four legions, with 11 genera and 40 species (Mel. Orth., vol. II., p. 455, &c.), to which Mons. Brunner adds the genus *Lissotrachelus* and six species, of which three are distributed among as many older genera, thus bringing up the totals to 12 and 46 respectively. These are distributed over all continents, only two species of one genus *(Calochilus)* being recorded from Australia, and one each of three other genera from New Caledonia, Tahiti, and Fiji respectively, but none endemic apparently.

The typical genus Myrmecophila comprises four species, viz., *M. acervorium*, L., S. Europe and N. Africa; *M. ochraceus*, Fisch. Sicily and Asia Minor; *M. dubius*, Saussure, Bitang (Malaysia?); and *M. Americanus*, Saussure, S. America; but none for Australia or its adjoining island regions. The genus is not only remarkable for the small size of its members, but also for the peculiar habit of living exclusively with and under the protection of particular species of ants.

Through the zeal and assiduity of A. Zietz, Esq., F.L.S., and Assistant-Director of the S.A. Museum, a pair of these minute crickets were secured on May 17th last among ants under large stones on a hillside near Adelaide, and placed under my care, when, on examination, they turned out to be a new species of the above interesting genus.

Both specimens were caught alive, although exceedingly nimble and active; but the male died soon after capture from injuries received. The female reached me alive next morning, and I kept her so for three days by moistening the inside of the cork stopper of the small glass tube with a little saliva daily and occasionally renewing the air by opening the same. The little creature seemed to like its strange fare and scarcely quitted the cork even while being turned about during inspection. The following description was drawn up from the fresh and living specimens:—

Myrmecophila australis, sp. n.

Male. Pale brownish-ochreous, ovate, flattened above, very thinly and minutely sericeous, head (except vertex), underside, and legs mostly whitish. Antennæ slightly longer than the body,

base subglobose, pale, scape brownish, hirsute. Eyes distinct, minute, oval, obliquely behind and external of antennæ, covered by the margin of the pronotum, black.

Pronotum subglobose, incrassated foremargin produced behind as a small acute tooth merging into the median line, ferrugineous, disk pale, hindmargin fuscous, with narrow pale border. Mesonotum and metanotum, also abdominal dorsal segments, bordered darkly behind.

Anterior and intermediary legs short and slender, hind legs about twice as long as the body, femora, tibiæ and tarsi nearly subequal, in length, pale. Hind femora ovate, about twice as long than wide, externally very convex, with a small protuberance before the middle near the upper margin ; inferior margin ciliate, ridges terminating by distinct teeth ; apex truncated, with a small, circular depressed area (resembling a tympanum), immediately beneath the insertion of the tibiæ, bearing a minute spinelet on its hindmargin (also present in the female but less perfectly) ; internal side of femora deeply concave.

Hind tibiæ slightly shorter than femora, subcompressed, upper margin concave, lower convex ; lower external spur minute, straight, upper much larger, distinctly recurved ; internal spurs very long, slightly decurved ; upper margin with one external and two internal spines, ciliated.

Hind tarsi longer than tibiæ, very slender ; first joint with three minute oblique spines and a longer terminal spur, second joint very short, third joint extremely slender and claws most minute.

Cerci about two-thirds of the length of the body, hirsute base thick, gradually tapering, apex acute, brownish ferrugineous. Supra anal lamina transverse, very short, rotundate, smooth.

Female.—Resembling male, but larger and darker. Antennæ more and base less incrassated. Eyes more prominent, less obtected. Abdomen wider posteriorly, darker above and beneath. Hind femora shorter and rather less robust. Supra-anal lamina subtrigonal, transverse ; a fine groove on either side of the middle when alive. Ovipositor rather stout, nearly half the length of the body ; subcylindrical, pale, slightly contracted in the middle ; apex forming two parallel acute spines, dark brown.

	Male.	Female.
Length of body	3 mm.	4 mm.
Width "	2 "	2·4 "
Length of hind legs ...	5·5 "	
Length of hind femora ...	2·2 "	2 "
Width of hind femora ...	1·5 "	1·3 "
Length of ovipositor ...	—	2 "

Habitat.—Hillsides near Adelaide, South Australia, under stones with ants.

When alive the insects are extremely active and nimble; when at rest the antennæ are carried subhorizontally diverging outwards in an easy curve; the femora are placed at an angle of 40—50° to the body, the tibiæ being adpressed to the inner upper margin and nearly parallel with it (not along the lower as is usually the case) the tarsus extending backwards in the same direction as the body. In this position the concavity of the inner side strongly resembles that of an outer ear, and suggests the idea of serving as an auditory organ together with the membranous plate at the apex. After death the body shrinks considerably and also becomes darker in color.

The species resembles the European one considerably, but differs in various details, such as size, the presence of eyes, the curved hind tibiæ, and having the spurs and spines of different form, &c.

New Australian Lepidoptera.

By Oswald Lower, F.E.S., &c.

[Read June 2, 1896.]

GEOMETRINA.

Hydriomenidæ.

Asthena porphyretica, n. sp.

Female, 22 mm. Head, thorax, antennæ, and abdomen ochreous grey. Abdomen with pairs of black spots on base of anterior segments; three posterior segments with one large spot on each. Forewings triangular, hindmargin bowed, oblique; ochreous grey, with dull purplish markings; numerous transverse narrow wavy lines, the confluence of which form a moderately broad band from beyond middle of costa to beyond middle of inner-margin; a black discal dot before this above middle; lines towards hindmargin more dense, and forming a suffused band; a hindmarginal row of black dots at extremities of veins; cilia ochreous grey. Hindwings with color and markings as in forewings, cilia as in forewings.

Two specimens in August at Rockhampton, Queensland. Nearest *xylocyma*, Meyr.

BOMBYCINA.

Limacodidæ.

Doratiphora euchrysa, n. sp.

Female, 34 mm. Head, thorax, palpi, legs, and antennæ golden rufous; thorax more reddish, patagia reddish fuscous, abdomen reddish fuscous. Forewings moderately dilated, costa nearly straight, apex rounded, hindmargin obliquely rounded; bright brassy yellow; costal edge narrowly fuscous; a fuscous band starting from base and continued along inner-margin right round hindmargin to apex; a narrow, hardly waved line from costa just before apex to middle of inner-margin; cilia dark fuscous. Hindwings pale ochreous-reddish, with a darker line at base; cilia pale reddish-ochreous.

A very striking species, not like any other species known to me. Two specimens, in November, received from Mr. Rowland Turner, of Mackay, Queensland.

LETHOCEPHALA (?) CALLIDESMA, n. sp.

Male, 32 mm. Head, abdomen, and legs reddish fuscous, tinged with darker fuscous; abdomen tinged with dark purplish-reddish on posterior half. Thorax deep purplish-fuscous, tinged with scarlet posteriorly; collar scarlet. Antennæ reddish, pectinations at greatest length four, gradually attenuated to apex, but not ending in a bristle. Forewings moderate, somewhat dilated posteriorly, costa almost straight, apex rounded, hindmargin obliquely bowed; deep reddish-fuscous, anterior half deep purplish-fuscous, separation well defined by an ochreous-white oblique, hardly sinuate line, from inner-margin at one-third to more than half across wing, then obscurely continued to just beneath costa at five-sixths; a dark fuscous, somewhat undulated line from apex of this streak to below middle of hindmargin; cilia reddish-fuscous. Hindwings with hindmargin rounded; reddish-fuscous, purplish tinged, becoming lighter towards costa; cilia as in forewings.

One specimen, Mackay, Queensland, in December. Not unlike *Lethocephala bombycoides*, Feld., but is shorter winged.

DORATIPHORA EUMELA, n. sp.

Female, 28 mm. Head, palpi, legs, antennæ, and abdomen fleshy white; legs minutely irrorated with black. Thorax pale reddish-fuscous, with a short black longitudinal streak behind collar. Forewings moderately dilated, costa hardly arched, apex rounded, hindmargin bowed, oblique; pale fleshy-brown, more or less suffused with whitish, with scattered minute blackish scales; a somewhat quadrate shining-fuscous patch extending from base to near middle, reaching more than half across wing, edged posteriorly with a line of white, and containing a round sharply-defined black spot near base; a large whitish ill-defined somewhat suffused round patch near apex, partly edged anteriorly by a fine fuscous line, and containing near its posterior edge a suffused fuscous mark, on which are placed three dark fuscous-cuneiform spots on veins, the apices directed inwards. The mark is edged posteriorly by a line of whitish, indicating extreme edge of round spot; cilia fleshy-white, with a whitish basal line. Hindwings with hindmargin rounded; dull fuscous, tinged with reddish; cilia as in forewings.

One specimen from Mackay, Queensland; sent by Mr. Rowland Turner.

ARCTIADÆ.

SORCOSTIA NIPHOSTENA, n. sp.

Female, 20 mm. Head and thorax white. Legs fuscous whitish; palpi three, fuscous, internally white. Antennæ and abdo-

men fuscous whitish. Forewings elongate triangular; costa moderately arched; hindmargin obliquely rounded; fuscous, mixed with darker fuscous; tufts fuscous, basal third of wing whitish, becoming fuscous tinged above and below middle; a fine blackish irregularly dentate line, somewhat curved inwards indicating posterior boundary of basal patch, followed by a very broad fuscous fascia, anterior edge from before middle of costa to one-third of inner margin and bounded by the fine black line; posterior edge ill-defined and lost in general ground-color, excepting on lower two-thirds which is rounded by a fine black edged snow-white line, commencing at two-thirds of inner margin with two indentations below middle, and continued obliquely to more than two thirds across wing, thence suddenly angulated and ending in hindmargin above middle; in the angulation is a very dark fuscous patch with three teeth, the apices directed towards hindmargin; a snow-white streak from above second angulation to anal angle; a large black discal dot; cilia fuscous-whitish. Hindwings and cilia grey-whitish.

One specimen at Port Victor, South Australia, in November. Nearest *albalis*, Walk.

PYRALIDINA.

Epipaschiadæ.

Epipaschia lithochlora, n. sp.

Male, 30 mm. Head, thorax, palpi and legs pale-greyish ochreous, palpi more whitish beneath; legs dusted with white. Antennæ greyish-fuscous. Abdomen greyish. Forewings moderate, dilated posteriorly; costa hardly straight arched towards apex; apex round pointed; hindmargin bowed; oblique; pale-fawn, with three indistinct transverse fasciæ of pale ochreous, causing the color to appear ochreous-grey; a very pale ochreous basal patch (being indications of first fascia), outer edge irregular, from one-third of costa to one-third inner margin and containing a raised tuft which is tinged with reddish fuscous spot on costa at about one-half; a tuft of reddish fuscous obliquely confluent with it, from which proceeds a waved pale ochreous line to middle of inner margin, indicating second fascia; a fuscous-reddish spot on costa at about two-thirds; a pale ochreous fascia from costa at five-sixths to inner margin at anal angle, preceded on lower half by a well-defined curved patch of reddish-fuscous, becoming strongly dentate posteriorly on veins, and edged by a line of ground-color; veins somewhat blackish on this patch; cilia ochreous-grey, with a median line of small blackish dots; tips tinged with fuscous. Hindwings fuscous, becoming dark-fuscous round hindmargin, especially round apex; cilia white, chequered with black on basal half.

Three specimens bred by Mr. R. Illidge, near Brisbane, Queensland, in November.

STERICTA (?) CALLIZONA, n. sp.

Female, 38 mm. Head, palpi, antennæ, thorax, and abdomen purplish-fuscous ; palpi very long. Legs purplish-fuscous ; anterior and middle coxæ fleshy white. Forewings moderately dilated; costa nearly straight ; arched towards apex ; apex rounded ; hindmargin obliquely rounded ; fuscous, slightly purplish tinged ; a broad white band starting from costa at base and continued obliquely to below middle of disc, thence suddenly curved to middle of inner margin ; extremities suffused, edged throughout beneath with fine blackish line, and broadly above with olive-green, which color is inclined to be suffused with band ; a small dark fuscous spot on band near base ; a raised tuft of dark fuscous scales on inner margin at about a quarter, and another larger beneath costa about middle ; a fleshy-white cuneiform mark on costa at four-fifths from anterior edge proceeds a fuscous line, dentate throughout, more strongly indented beneath costa and with a strong angulation outward above middle, anteriorly edged on upper half by a large fleshy-white patch containing a small spot of ground-color, and posteriorly by a suffused whitish line, more pronounced on upper half ; an apical blackish patch containing two or three suffused fleshy-white spots ; a row of obscurely whitish spots near parallel to hindmargin ; cilia fleshy white, extremities blackish on basal half chequered with black and white. Hindwings dark fuscous ; cilia as in forewings, but extremities more reddish.

One specimen from Mackay, Queensland, in December. The palpi of this are very long and quite a peculiar character. I am not sure if it is referred to its correct genus.

STERICTA CHIONOPA, n. sp.

Male, 30 mm. Head white, palpi fuscous. Thorax white with a broad fuscous longitudinal band, darkest posteriorly. Collar dark fuscous. Antennæ and legs dark fuscous, base of antennæ white beneath ; all tibiæ and tarsi ringed with white. Abdomen ochreous, sides and anal tuft fuscous, whitish beneath. Forewings moderate, dilated posteriorly ; costa nearly straight, arched towards apex, apex rounded, hindmargin obliquely rounded ; snow-white, with dark fuscous markings ; a large broad cuneiform spot on costa from near base to about a third ; a very suffused irregular line from anterior edge of this spot to inner margin near base ; an almost imperceptible line from posterior edge of cuneiform spot and continuous with it to inner margin near middle, interspace with a slight bluish tinge and sparsely irrorated with minute fuscous scales ; an elongate mark on costa at about two-

thirds, below which is a well-marked discal spot ; a broad irregularly edged transverse band from costa at four-fifths to inner margin at three-quarters, containing a suffused spot of ground-color on inner margin ; a large roundish hindmarginal patch, darkest and well-marked on upper half, and nearly confluent with preceding band, and enclosing a prominent spot of ground-color on costa at five-sixths ; lower half of hindmarginal band strongly suffused with ground-color posteriorly ; the separation of transverse and hindmarginal bands is accomplished by a fine waved line of ground-color, which is split up into two spots on apical portion ; a hindmarginal row of black dots on hindmargin, strongly perceptible on lower half ; cilia fleshy-white, basal half chequered with black. Hindwings fuscous ; cilia grey-whitish with a darker fuscous line near base.

Two specimens taken at Railway Station electric light, Brisbane, Queensland, in December and January. A very unique looking insect.

STERICTA (?) STREPTOMELA, n. sp.

Female, 30 mm. Head, thorax, palpi, abdomen and legs dull fleshy-pink, densely irrorated with fine white scales. Abdomen with blackish segmental rings, that on the second segment being black. Forewings elongate-triangular, posteriorly dilated ; costa hardly straight, somewhat sinuate on anterior half ; hindmargin obliquely rounded ; dull fleshy-pink, densely irrorated with dull white scales so as to appear fuscous-whitish ; markings somewhat obscure ; a very ill-defined pale-fuscous line curved outwards from a quarter of costa to about a third of inner margin, a strongly defined black line from three-quarters of costa to just before anal angle, strongly dentate outwards and emitting four teeth in middle, thence with a very strong indentation inwards and continued as a thicker streak to before anal angle ; a suffused outwardly oblique mark on costa before middle, extremity forming an irregular discal dot, and nearly touching apex of indentation of last mentioned line ; a hindmarginal row of black dots ; cilia whitish, chequered with fuscous on basal half. Hindwings whitish-fuscous, becoming whitish towards base, and broadly fuscous round hindmargin ; cilia white with a fuscous basal line. Hindwings beneath shining with iridescent white, with a fuscous hindmarginal line, becoming attenuated on inner margin.

One specimen from Duaringa, Queensland, in December.

STERICTA LEUCODESMA, n. sp.

Male, 28 mm. ; female, 31 mm. Head and legs fuscous mixed with white ; middle and posterior tarsi ringed with white. Thorax fleshy-white, lighter posteriorly. Forewings elongate triangular ; costa straight ; hindmargin obliquely rounded ; dark fuscous, be-

coming more or less ochreous on median third ; a somewhat curved moderately thick white line from just beyond one third of costa to about one third of inner margin, posteriorly edged by its own width of ground-color ; a white spot (being indication of a second similar line) on costa at about two-thirds from which proceeds a fuscous dentate line to inner margin before anal angle, with three outward angulated teeth in middle ; a blackish hindmarginal line, interrupted on veins by dull whitish points ; cilia reddish fuscous, chequered with blackish and with a whitish basal line. Hindwings pale fuscous-grey, more fuscous tinged round hindmargin ; cilia greyish, with a fuscous median line.

Four specimens near Bulimba, Queensland, also one at electric light at Railway Station, Brisbane, Queensland, in November, December, and January.

BOTYDIDÆ.

Metallarcha crocanthes, n. sp.

Male, 25 mm. Head, palpi, thorax, and antennæ bright-yellow. Palpi fuscous above. Abdomen ochreous-yellow, with blackish segmental rings. Anal tuft ochreous-yellow. Legs ochreous-yellow, anterior pair fuscous. Forewings moderate, elongate-triangular ; costa hardly sinuate, apex tolerably rounded ; hindmargin obliquely rounded ; bright brassy-yellow, with leaden markings ; a narrow streak along costa from base to near apex, attenuated at extremities, more so at base ; a narrow, erect mark, reaching more than half across the wing, from inner margin before one-half ; a rather thick outward curved mark from costa at about one-third to disc beyond middle, confluent at extremity with a moderately round discal dot ; a moderate thick streak along hindmargin, attenuated at anal angle, and continued for a short distance along inner margin ; cilia bright-yellow, with a few leaden scales round apex. Hindwings leaden-fuscous ; cilia as in forewings.

One specimen received from Mr. E. Guest (who has taken others) at Hoyleton, South Australia, in March.

SCOPARIADÆ.

Scoparia anthomera, n. sp.

Male, 20 mm.; female, 23 mm. Head, thorax, palpi, antennæ, and legs fuscous. Palpi mixed with yellowish ; tarsi ringed with yellow ; posterior legs ochreous-yellow. Abdomen yellowish, more or less fuscous-tinged ; anal tuft yellowish. Forewings moderate ; costa nearly straight, apex rounded ; hindmargin obliquely rounded, dark-fuscous, markings ochreous-whitish, irregularly edged with black ; a roundish spot just above middle of wing at one-fourth ; a pair, somewhat confluent, and similar

obliquely placed at about three-fifths, and in a line with first spot; a moderately suffused spot on inner margin beyond, strongly edged posteriorly with black; a short suffused spot on costa at about three-fourths, cut by a black line, which is angulated outwardly, and continued suffusedly to inner margin before anal angle; an indistinct yellowish suffusion along hindmargin, indistinctly intersected by veins, followed by a dot-like blackish hindmarginal line; cilia fuscous, with a blackish median line. Hindwings yellow, with a blackish hindmarginal band, broadest at apex, and finely attenuated towards anal angle; cilia fuscous, darker on basal one-half, and becoming ochreous-grey at and around anal angle.

One specimen at Norwood, South Australia, and one at Gawler, South Australia, in September.

Scoparia hypoxantha, n. sp.

Female, 28 mm. Head, palpi, antennæ, and thorax fuscous; palpi whitish beneath. Legs ochreous, mixed with fuscous; posterior pair yellowish-ochreous. Abdomen greyish-ochreous. Forewings moderate; costa gently arched, apex obtuse; hindmargin obliquely rounded; fuscous, mixed with reddish and darker-fuscous; a rather suffused-white line from one-fourth of costa to beyond one-fourth of inner margin, preceded by a more or less suffused-whitish patch; a well-defined, irregular dentate, white line from about three-fourths of costa to about three-fourths of inner-margin, with a strong angulation outwards in middle; a hindmarginal series of obscure, elongate, blackish spots; cilia fuscous-whitish, basal half dark-fuscous. Hindwings with apex somewhat prominent; pale-yellow; a fuscous hindmarginal band, broadest at apex; an elongate fuscous discal spot, indistinct; cilia yellow, with a fuscous median line.

One specimen at Parkside, South Australia, in December, and one specimen from Mr. G. Lyell, of Gisborne, Victoria.

CRAMBIDÆ.

Talis cyclosema, n. sp.

Male, 24 mm. Head, palpi, antennæ, and thorax dark ochreous-fuscous. Thorax with two fine longitudinal silvery lines; palpi beneath somewhat whitish. Antennal ciliations 2. Legs dark-fuscous; posterior pair dusted sparsely with white. Abdomen ochreous-whitish. Forewings moderate, elongate; costa gently arched; apex rounded; hindmargin obliquely rounded; dark ochreous-fuscous; a straight, silvery-white, longitudinal streak in middle of wing from base to middle of hindmargin, sinuate upwards at about three-fourths, and containing a well-marked black spot in sinuation; the streak is edged above throughout

with a blackish line, more perceptible posteriorly; a somewhat curved silvery-white streak, cutting through longitudinal streak, from apex to anal angle, attenuated towards anal angle; a fine waved, black, hindmarginal line, edged anteriorly with silvery-white; cilia ochreous-fuscous, mixed with whitish, more persistent around apex. Hindwings grey, tinged with fuscous towards apex; cilia grey-whitish, with a fuscous-dividing line, leaving a narrow strip of whitish at base.

Two specimens received from Mr. E. Guest, Hoyleton, South Australia. One specimen from Trafalgar, Victoria; taken in March. Nearest *acontophora*, Meyr., but apart from its smaller size, it may be best distinguished from that species by the darker ground-color, the antennal ciliations, and apical streak. At first sight not unlike *xylophœa*, Meyr.

PHYCIDIDÆ.

EUZOPHERA (?) PYRRHOPTERA, n. sp.

Male, 25 mm. Head, antennæ, palpi, and thorax dark fuscous-purple, somewhat mixed with whitish, palpi whitish internally; antennæ swollen towards base. Ciliations about $\frac{1}{2}$. Legs fuscous-purple, mixed with whitish, and with a tuft of whitish hairs on apex of joints; posterior pair reddish, all tarsi ringed with white. Abdomen coppery-reddish. Forewings moderate, costa strongly arched towards base, thence nearly straight; apex obtuse, hindmargin obliquely rounded, costa beneath with a fold or fringe of dark fuscous hairs edged with whitish, somewhat elliptical in shape, and extending from base to one-third; dark fuscous-purple, very finely irrorated with whitish; a moderately broad outwardly oblique whitish transverse fascia from about one-fourth of costa to one-third inner-margin, posterior edge bounded by a patch of very dark ground-color, which causes the fascia to appear prominent; an outwardly-curved pale flesh-colored line, containing a disconnected row of dark fuscous dots in centre, from beneath costa at about three-fourths to just before four-fifths of inner-margin; a very fine dark fuscous hindmarginal line, somewhat dot-like; cilia fuscous purple, tips whitish; a fuscous basal line separated by a line of whitish. Hindwings pale fleshy-pink, with a darker hindmarginal line; cilia fleshy-pink, with ochreous basal and fuscous subbasal line. Wings beneath fleshy-pink, excepting basal half of forewings above middle, which is fuscous purple.

One specimen at Brisbane, Queensland, in August. A very beautiful species. The curious fringe-like appendage is very noticeable, as is also the tufted tibiæ. Recalls a large *Ephestia* in general appearance.

EUZOPHERA (?) THERMOCHROA, n. sp.

Female, 20 mm. Head ochreous yellow. Antennæ, palpi, thorax, legs, and abdomen dark fuscous; palpi and anterior portion of thorax coppery-fuscous, tarsi finely annulated with white. Forewings moderate, dilated posteriorly; costa gently arched, apex round pointed, hindmargin obliquely rounded, bluish white, an irregular dentate double black line, internal line darkest, from costa at one-third to inner-margin at half, containing a line of ground-color; an irregular line of blackish from three-fourths of costa to three-fourths of inner-margin, with two sharp angulations, one above middle and one beneath costa, edged posteriorly throughout with a line of its own width of bluish-white; an elongate black discal dot in middle of wing; area beyond posterior line somewhat reddish-tinged; a hindmarginal row of black dots; cilia fuscous, with a blackish line at base. Hindwings bright orange, apex infuscated; cilia yellow, on apex and upper-half of hindmargin blackish.

Distinct by the hind-wings. One specimen at Rose Bay, Sydney, N.S. Wales, in November, and one at Sandringham, Victoria.

TORTRICINA.

TORTRICIDÆ.

ANISOGONA PLACOXANTHA, n. sp.

Male, 16 mm. Head, palpi, and thorax fuscous; palpi beneath ochreous-tinged. Legs and antennæ fuscous, posterior tibiæ ringed with whitish-ochreous, basal joint of antennæ ochreous. Abdomen fuscous, whitish beneath. Forewings moderately broad, costa gently arched towards base, apex nearly rectangular; hindmargin somewhat sinuate beneath apex; ochreous, brownish tinged, with deep chocolate markings; basal patch much lighter; outer edge of basal patch from one-fifth costa to one-fourth inner margin; central fascia broad, well-defined, anterior edge nearly straight from one-third of costa to before middle of inner margin; posterior edge from just beyond one-third of costa to just before anal angle; strongly contracted on costa and curved outwards on lower five-sixth; a well-defined elongate triangular patch on costa at four-fifths, lower extremity almost touching posterior edge of central fascia and enclosing a triangular spot of clear yellow on costa; a short cuneiform mark obliquely placed on hindmargin above anal angle, obsolete in some specimens; cilia light-ochreous fuscous. Hindwings grey, broadly suffused with fuscous or light-fuscous hindmargin; cilia greyish, fuscous at base.

This distinct and handsome species is not unlike a *Dichelia* in general appearance. The male specimen, although abraded, appears to have the tufted abdominal anal valves and short palpi, conse-

quently I refer it to *Anisogona*. According to description it differs from *similana* by the absence of the fuscous spots on costa at one-third and two-thirds and color of hindwings. The triangular yellow spot on costa is very conspicuous and enhances the beauty of the species. One specimen from Stawell, Victoria, and one from Gippsland, Victoria, taken in December and received from Mr. G. Lyell, jun., of Gisborne.

DICHELIA (?) AMÆBŒA, n. sp.

Female, 15 mm. Head, palpi, thorax, antennæ, and abdomen dark fuscous; palpi lighter internally. Abdomen whitish beneath. Legs whitish, externally somewhat infuscated. Forewings moderately broad, somewhat dilated posteriorly; costa gently arched, apex obtuse; hindmargin almost straight, hardly sinuate in middle; dull purplish-fuscous, strigulated with darker fuscous; ground color, becoming lighter towards hindmargin; a sharply defined pale flesh colored triangular blotch, extending on costa from middle to near apex and reaching nearly half across the wing; edged by a thick black shade almost its own width; on the lower extremity of patch is a fine irregular line of ochreous-white; several short oblique blackish lines on costal portion of patch; three or four short blackish marks above anal angle, an indistinct blackish mark on upper part of hindmargin; cilia grey, tips fuscous. Hindwings with hindmargin very slightly sinuate beneath apex; dark fuscous; cilia grey, with a dark fuscous median line.

This species, which is remarkably distinct, hardly seems referable to this genus. So far as can be made out, without dissection, both veins seven and eight appear to run to the *costa*, a character hitherto only known to occur in *Mictoneura*, Meyr. There is, however, no sign of any crest on the thorax, which at once removes it from that genus. The neuration of the hindwings is similar to *Dichelia*, consequently I refer it, until I obtain more material, to that genus, but not without some hesitation. I took one beautiful specimen at Brisbane ("Kedron Brook"), Queensland, in December, beaten from an aquatic plant.

TORTRIX (?) PYRRHOPA, n. sp.

Female, 16. Head, thorax, and abdomen fuscous; abdomen whitish beneath. Antennæ and legs ochreous fuscous. Forewings moderate, slightly dilated posteriorly, costa gently arched, apex rounded, hindmargin sinuate in middle; dull reddish fuscous, irregularly strigulated with darker fuscous and blackish; a suffused darker fuscous quadrate patch on inner-margin from base to before middle, reaching more than half across wing; extreme costal edge ochreous-white; cilia reddish-fuscous. Hindwings with hindmargin rounded, somewhat sinuate in middle;

bright orange; a very broad fuscous suffusion, occupying three-fourths of wing, suffusedly continued along hindmargin to base; cilia orange (imperfect).

One specimen from dense scrub in December, at Mackay, Queensland. This is another doubtful species. It partakes of all the characters of *Dipterina*, excepting the palpi, the terminal joint of which is exposed, which I consider sufficient to remove it from that genus. It does not agree with the genus *Tortrix*, through the stalking of veins six and seven of the hindwings. The specimen being a female, it admits of no definite decision in regard to the antennal characters. In general appearance it is not unlike *Scolioplecta comptana*, Walk.

ATYCHIADÆ.

Atychia anthomera, n. sp.

Male, 12 mm. Head, palpi, thorax, and abdomen fuscous. Thorax beneath ochreous-whitish. Antennæ black at base, beneath ochreous-white. Abdomen with faint whitish segmental rings; anal tuft fuscous, mixed with yellow. Forewings moderate, short; costa almost straight; apex rounded. Hindmargin obliquely rounded, dark-fuscous; a faint somewhat hyaline yellowish spot in disc at two-thirds, hardly perceptible in some specimens; cilia yellowish with a median line of dark fuscous somewhat dotted with yellow. Hindwings yellow, with a broad blackish hindmarginal band, occupying nearly half of wing, broadest at apex; cilia as in forewings. The whole of the discal area of forewings is suffused with light-yellow on the underside.

Nearest *leucopis*, Meyr., but widely different by the yellow hindwings. Three specimens at Rockhampton, Queensland, in April.

Atychia desmotoma, n. sp.

Male, 25 mm. Head, antennæ, palpi, thorax, abdomen, and legs dark-fuscous. Palpi ochreous-white beneath. Abdomen with faintly indicated whitish segmental rings. Forewings moderate; costa nearly straight; apex rounded; hindmargin obliquely rounded; dark glossy-fuscous, with a faintly indicated yellow spot in disc at two-thirds; a hardly perceptible whitish suffusion immediately beyond, seemingly continued as a transverse fascia to inner margin; cilia dark-fuscous. Hindwings dark-fuscous; a roundish yellow spot just below costa at about middle; two more of same color somewhat suffused and confluent, running from near beyond first to middle of inner margin, the three forming a band, cut by ground-color between first and second; cilia light-yellow. The whole of the markings are more prominent on the

underside, and the hindwings have an additional yellow spot on costa near apex.

Two specimens from Melbourne and Cheltenham, Victoria, in December. It is not unlike a larger form of the previous species, but this is hardly probable, as the differences are well marked, and the balance seems in favor of giving it a distinctive name.

Xyloryctidæ.

Xylorycta candescens, n. sp.

Female, 26 mm. Head, palpi, and thorax shining snow-white, second joint of palpi internally fuscous. Thorax with an irregular fuscous quadrate blotch in middle. Antennæ whitish. Legs whitish, anterior tibiæ and tarsi fuscous. Abdomen whitish, segmental margins ochreous. Forewings elongate, moderate, hardly dilated, costa nearly straight, apex somewhat pointed; hindmargin oblique; shining snow-white; extreme costal edge ochreous, becoming indistinct at and around apex, fuscous at base; a broad light fuscous longitudinal streak along inner margin, from near base to anal angle, and continued right through cilia, somewhat attenuated anteriorly; cilia shining snow-white, except at anal angle, which is fuscous through continuation of longitudinal streak. Hindwings pale-grey; cilia shining snow-white.

Brisbane, Queensland. One specimen in December. Remarkably distinct, the continuance of the fuscous longitudinal streak through the cilia is a curious and noticeable character.

Telecrates desmochrysa, n. sp.

Male, 16 mm. Head, legs, and palpi orange-yellow; terminal joint of palpi as long as second, fuscous, second joint infuscated exteriorly. Legs banded with black. Abdomen and antennæ black; abdominal segments orange on margins, anal tuft orange. Forewings rather short, hardly dilated; costa arched at base, thence tolerably straight, apex rounded; hindmargin oblique; black, with ochreous markings; a narrow oblique fascia from costa at base to about one-eighth inner margin; an oblique fascia from beneath costa at one-fourth to below middle of disc at about one-fourth; upper portion somewhat irregular and broken; a similar fascia in middle of wing, not reaching either margin, with a semi-circular excavation on lower portion of anterior edge; an irregular spot on costa at about five-sixths; a dentate line immediately beneath this, somewhat curved, not reaching but approaching anal angle; cilia blackish, with a tooth of yellow at apex. Hindwings bronzy-fuscous; veins 6 and 7 from a point; a well marked wedge-shaped orange spot along base,

but not reaching inner margin, apex uppermost ; cilia blackish, becoming orange at apex and anal angle ; costa of both forewings and hindwings orange.

Nearest *lætiorella* Walk., but widely distinct. One specimen from *Banksia (? serrata)* at Port Victor, South Australia, in November.

CRYPSICHARIS PUDICA, n. sp.

Male, 20 mm.; Female, 22 mm. Head, thorax, palpi, antennæ, legs and abdomen creamy-white ; second joint of palpi externally fuscous ; antennal ciliations of male 3 ; anterior and middle legs more or less infuscated. Forewings moderate ; costa gently arched, apex obtuse ; hindmargin obliquely rounded ; vein 7 to hindmargin, creamy-white, extreme costal edge fuscous towards base (faintly perceptible), a small black dot in middle of wing at one-third ; a second obliquely beyond on fold, and a third above second ; a series of fuscous dots from beneath costa at two-thirds ; curved round hindmargin to inner margin before anal angle ; cilia white. Hindwings and cilia white ; veins 6 and 7 stalked. Not unlike a faded specimen of some species of *Hoplitica (Œcophoridæ)*, especially *sobriella*, Walk.

Four specimens beaten from *Eugenia* at "Kedron Book," Brisbane, Queensland, in January. The species under notice may ultimately require a new genus to receive it, as the neuration of the hindwings is not in perfect accord with *Crypsicharis*, but as intermediate forms may be discovered in the future I consider it advisable to refrain from forming a new genus at present.

ŒCOPHORIDÆ.

EOCHROIS SARCOSMA, n. sp.

Female, 28 mm. Head, palpi, and thorax, fleshy white, hairs of second joint of palpi somewhat loose at apex, basal half fuscous beneath. Antennæ pale reddish, hairs of pecten reddish. Legs and abdomen pale flesh-color, anterior and middle legs infuscated. Forewings moderate, slightly dilated posteriorly ; costa almost straight, arched at base, apex rounded hindmargin obliquely rounded; pale fleshy-pink ; extreme costal edge pale carmine ; a moderately broad longitudinal whitish streak immediately beneath costa, from base to about two-thirds, somewhat suffused and shading into ground-color on lower half ; a small blackish spot on fold beneath middle at one third ; a larger one obliquely above it, and a double one in middle at two-thirds, all more or less mixed or edged with reddish ; cilia salmon-pink, inclining to yellowish. Hindwings pale ochreous, apical half somewhat purplish-fuscous ; cilia pale salmon-pink, becoming yellowish at base and with a faint fuscous basal line.

One fine specimen taken by Mr. Horace Lower, at Cock-

burn, S. Australia, in April (at light). I have another specimen, which may be the male of this species, but it is not in a fit condition to describe, therefore the point cannot be determined with certainty. The only difference, so far as can be made out, is the smaller size and deeper color of forewings. This specimen was taken by myself at Broken Hill, N.S. Wales, in May.

Eulechria tetratherma, n. sp.

Male, 25 mm. Head, antennæ, abdomen, and legs blackish-fuscous, posterior and middle tibiæ and tarsi ringed with orange. Abdomen beneath orange-yellow. Thorax yellow, anterior half blackish-fuscous; palpi orange, terminal joint and extreme apex of second blackish-fuscous. Forewings moderate, rather narrow; costa slightly arched, apex rounded, hindmargin obliquely rounded; blackish, with bright orange markings; a small basal spot; a tolerably broad fascia, from immediately beneath costa at about one fifth to above inner margin at one quarter; a second similar and nearly straight, from middle of costa to middle of inner margin; an elongate triangular spot from costa at five-sixths, reaching more than half across wing, indented below middle on posterior portion; cilia blackish-fuscous. Hindwings ovate-lanceolate; bright orange; hindmargin narrowly and apex broadly suffused with blackish; cilia as in forewings.

A beautiful and distinct species in the neighborhood of *xanthostephana*, Meyr., but immediately known from that or any other allied species by the hindwings. One specimen taken at Brighton, Victoria, in December.

Eulechria deltacostamela, n. sp.

Male, 22 mm.; female, 24 mm. Head and palpi dull yellowish; second joint of palpi fuscous beneath, except apex. Thorax ochreous fuscous, darkest anteriorly. Abdomen ochreous. Legs and antennæ dark fuscous, antennal ciliations one and a half. Forewings moderate, costa gently arched, apex rounded, hindmargin obliquely rounded; pale ochreous, tinged with fuscous; a dark fuscous, irregularly oblique fascia, anterior edge well defined, from costa at base to inner-margin at about one-sixth, posterior edge very suffused, from about one-sixth of costa to one-third of inner-margin, with a more or less well defined projection on middle; space between anterior edge of fascia and base ochreous-white, sharply defined; a small indistinct fuscous spot above middle of disc at one-third; a sharply defined blackish elongate, hardly triangular, spot on costa at about three fifths; an indistinct spot below posterior edge of this, being an indication of a zigzag line from costa; a small fuscous mark beneath costa at five-sixths; a hindmarginal row of small fuscous dots; cilia

ochreous-grey, mixed with fuscous. Hindwings grey or fuscous-grey; cilia greyish-fuscous.

Four specimens taken at Duaringa, Queensland, in June. Not near any other species of the genus known to me, but reminds one of some species of *Phlæopola*. The whitish basal patch and its separation by the anterior line of dark-fuscous fascia is a very good distinguishing point.

EULECHRIA THERMISTIS, n. sp.

Male, 25 mm. Head, palpi, antennæ, legs, and abdomen blackish-fuscous. Legs mixed with white, hairs of posterior pair yellowish. Forewings moderate, costa gently arched, apex rounded, hindmargin obliquely rounded; dark fuscous, finely and irregularly irrorated with leaden-whitish scales, extreme costal edge slightly yellowish in middle, two thick black transverse parallel lines from one-third of costa to abont one-third of inner-margin, confluent on inner-margin; a small indistinct blackish spot in disc below middle at two-thirds; a thick black transverse band from four-fifths of costa to anal angle, narrow on costa, containing a whitish dot in middle; veins between this band and hindmargin neatly outlined with black; cilia blackish. Hindwings orange; a moderately broad, blackish hindmarginal band, broadest at apex; cilia blackish.

One specimen bred from *Blue Gum* by Mr. G. Lyell, jun., of Gisborne, Victoria, in October. It is closely allied to *philotherma*, Meyr., but is immediately distinguished by the color of the head, the costal edge, and differently arranged markings of forewings.

PHILOBATA GONOSTROPHA, n. sp.

Male, 23 mm. Head, thorax, antennæ, palpi, and legs ashy grey-whitish, lower two-thirds of second joint of palpi whitish externally, posterior legs ochreous-whitish. Abdomen light fuscous, segmental margins and anal tuft grey-whitish. Forewings elongate, moderate; costa gently arched, hindmargin obliquely rounded; ashy-grey-whitish, mixed with white along inner margin towards base and above middle of disc towards hindmargin; a short black longitudinal mark on fold about middle, a shorter similar mark above this, a moderate black line starting from between the two elongate marks, continued beyond them, thence with a strong curve round to beneath costa at about three-quarters, then continued obliquely to costa before apex; a curved row of elongate black spots before hindmargin, becoming lost in ground-color towards apex; cilia ashy-grey-whitish. Hindwings dark fuscous-grey; cilia fuscous-grey, with a darker basal line.

One specimen at Broken Hill, N.S.W., in May. Not unlike some species of *Eulechria*, especially *xylopterella*, Walk.

GLYPHIPTERYGIDÆ.

Simæthis chionodesma, n. sp.

Female, 12 mm. Head, thorax, and antennæ dark-fuscous. Antennæ annulated with whitish-ochreous. Thorax beneath ochreous. Palpi ochreous; anterior legs ochreous, banded with blackish. (Abdomen broken.) Forewings short, triangularly dilated; costa arched, more strongly towards apex; apex round-pointed; hindmargin obliquely rounded, hardly sinuate beneath apex; deep purple-fuscous; a straight, broad, whitish, transverse band, from one-third costa to one-third inner-margin, containing a yellow streak throughout, posteriorly slightly fuscous-edged; anterior edge of band straight, posterior edge somewhat denticulate, and with a sharply-marked indentation above middle; cilia fuscous, with two broad yellow teeth, one below apex, the other just below middle. Hindwings moderately broad; ochreous-fuscous; two elongate cuneiform orange marks, attenuated at base; one in middle of wing, the other very near inner margin, more or less confluent at base; two large suffused orange blotches, placed one at end of each spot, and almost touching hindmargin; cilia as in forewings.

One specimen taken in Botanic Gardens, Brisbane, Queensland, in January. The specimen before me not being in the best of condition, this description may require extension; for instance, there appears to be a short whitish mark on inner margin near, but I am inclined to think this is caused by the denudation of scales, yet it seems a natural marking; there also appears to be a blackish dot in the transverse band, but the setting-needing has pierced the mark, and obliterated all but a trace of black.

Simæthis ophiosema, n. sp.

Female, 14 mm. Head, thorax, antennæ, and abdomen dark-fuscous. Thorax with a narrow, pale-yellow anterior band, posteriorly edged with a band of fuscous. Antennæ annulated with white. Abdomen with a median orange blotch. Legs and palpi ochreous-yellow; palpi tinged with blackish; anterior tarsi ringed with blackish. Forewings triangularly dilated; costa arched; hindmargin irregularly rounded, hardly sinuate beneath apex; dark-fuscous, with fuscous irregular markings; a dull-whitish basal patch; a similarly colored, slightly curved, transverse band, edges denticulate, separated from basal patch by a narrow, wavy, dull, orange-ochreous band, sharply edged on either side by a fine black line; another very irregular, dull-whitish band, running from before apex to anal angle, abruptly curved inwards, and containing two or three sharp teeth on lower half anteriorly; anterior to these teeth the ground color is darker, causing the markings to become more distinct on the upper half;

a fine, black-edged band of dull orange, from about two-thirds costa, and appearing to join the three teeth at extremity; a suffused, triangular patch of ground color on costa midway between bands; an irregular line of orange along hindmargin; a double black hindmarginal line, containing a streak of dull-orange throughout; cilia fuscous, with two whitish spots above and below middle. Hindwings orange; costa blackish, with a somewhat elongate cuneiform mark attenuated to base; a broad, blackish, hindmarginal band from apex to anal angle, and containing a streak of ground color, emitted from about half of band to base, and a similar one along inner margin to base; extremities confluent, and containing a streak of ground color; cilia dull ochreous-orange, dark-fuscous around anal angle; a dark-fuscous, sharply-defined basal line.

A difficult and somewhat complicated insect to clearly describe. The description of *sycopola*, Meyr., is in many respects similar to this species, but the thorax and hindwings are good distinguishing points. Two specimens taken at Rockhampton, Queensland, in February.

Gelechiadæ.

Gelechia anthochra, n. sp.

Male, 16 mm. Head, thorax, and palpi, pale ochreous-whitish, apex of second joint and a central ring of terminal joint blackish. Legs dark fuscous, with ochreous-whitish tarsal rings; posterior legs and abdomen ochreous-white. Antennæ fuscous-whitish. Forewings moderate, costa hardly arched, apex rounded, hindmargin obliquely rounded; pale ochreous-white, with dark fuscous markings; a short oblique mark on costa near base; a spot just beneath costa at one-fourth; a second larger, obliquely beneath and before it; a third smaller, obliquely beneath and beyond the first; a fourth very small, immediately above the third; and a fifth similar to fourth, and in a line with it, beyond middle; a suffused spot on costa at three-fourths, emitting a row of very suffused spots round apex to hindmargin above anal angle; hindmarginal and apical area more or less irregularly suffused with fuscous; cilia ochreous-grey, basal half pale fuscous. Hindwings greyish-fuscous; cilia greyish-ochreous.

Three specimens from Rockhampton, Queensland, in September.

Gelechia xanthastis, n. sp.

Male, 10 mm. Head, thorax, and palpi bright yellow, thorax anteriorly narrowly fuscous-purple, patagiæ fuscous-purple, terminal joint of palpi fuscous. Antennæ fuscous, imperfectly annulated with yellow. Legs fuscous, anterior and middle tibiæ and tarsi with yellowish rings, posterior legs and abdomen ochreous-yellowish, somewhat infuscated. Forewings moderate, costa nearly straight, apex round pointed; hindmargin obliquely

rounded ; bright yellow, with dark fuscous-purple markings ; a broad straight fascia close to base, edges concave ; a broader straight-edged transverse fascia from three-fourths to just before anal angle; a moderate hindmarginal band not quite reaching anal angle, but nearly touching second fascia at lower extremity ; cilia fuscous-purple. Hindwings dark fuscous ; cilia fuscous, with a tooth of pale yellow on costa.

Three specimens taken at electric light, at Rockhampton, Queensland, in December.

GELECHIA DELTODES, n. sp.

Female, 20 mm. Head, palpi, and thorax ochreous-white. Head smooth, antennæ fuscous, basal fourth ochreous ; legs dark-fuscous ringed with ochreous white. Abdomen dark-fuscous, anal tuft ochreous. Forewings moderate ; costa nearly straight ; hindmargin oblique ; dark bronzy-fuscous, with ochreous markings ; a small roundish basal spot ; a large irregular quadrate spot on inner margin at anal angle, becoming more yellowish posteriorly, and irregularly edged anteriorly by a blackish line, from which are emitted two obscure blackish lines on veins, going towards, but not reaching base of wing ; about five small spots on costa irregularly edged with black, from posterior one proceeds a curved row of minute spots round hindmargin to anal angle ; three or four small irregular spots in disc ; cilia greyish-fuscous, basal half blackish. Hindwings and cilia greyish.

A distinct and easily recognised species, the quadrate patch giving it a very distinct appearance. One specimen taken at Gisborne, Victoria, in October, by Mr. G. Lyell, jun.

GELECHIA HŒMASPILA, *Lower.*

GELECHIA NANA, *Lower.*

Recent captures of the above species at Broken Hill, N.S.W., during August and September have convinced me that they are identical, the variations, however, are exceedingly great. From a series of 16 specimens no less than eight varieties were obtained, three of which at least would, in the absence of a series, lend themselves to be considered distinct species. I am satisfied, however, that they are one and the same.

Var. A.—All markings obsolete excepting the "irregular cordate spot" at one third, which is, however, almost black instead of being reddish.

Var. B.—All marking as type, but forewings with two fine sharply defined black streaks, one from base to the "irregular cordate spot," and another from upper edge of spot to middle of hindmargin with a blackish tooth in middle.

Var. C.—All spots on costa connected with black lines along veins, all other veins outlined with black, giving the appearan of alternate lines of ground-color and black.

One noticeable character throughout the whole of the varieties is the persistence of the fiery reddish spot on *inner margin* near base. I purpose retaining the specific name *hæmaspila* for the species as being more appropriate in definition.

Crocanthes epitherma, n. sp.

Male, 10 mm.; Female, 12 mm. Head, thorax, antennæ, palpi and legs ochreous-white ; antennæ slightly longer than forewing ; terminal joint of palpi internally tinged with fuscous on apical half ; abdomen yellow. Forewings moderate elongate ; dilated posteriorly ; costa gently arched ; apex somewhat pointed ; hindmargin oblique, slightly sinuate beneath apex ; bright orange-yellow ; a thick fuscous, streak along basal half of costa ; a faint elongate fuscous spot on costa just beyond this, from which proceeds a faint curved line to about middle of hindmargin, but hardly reaching it ; a few faint fuscous scales along inner margin towards base ; a strongly marked fine black hindmarginal line, hardly reaching margins ; cilia blackish-fuscous, becoming yellow round anal angle, tips darker. Hindwings with apex somewhat prominent, pale yellow ; a very faintly indicated angulated line from middle of costa approaching inner margin, but not reaching it ; hindmarginal line as in forewings ; cilia pale yellow, becoming fuscous at apex.

Eleven specimens in dense scrub at Mackay, Queensland, in December.

Crocanthes acroxantha, n. sp.

Male and Female, 12 mm. Head, palpi, antennæ ; legs and thorax ochreous-white. Antennæ longer than forewings ; posterior tibiæ and tarsi ringed with blackish. Abdomen yellow. Forewings moderate elongate, rather narrow ; costa gently arched, more strongly towards apex ; apex somewhat pointed ; hindmargin obliquely rounded, sinuate somewhat beneath apex ; yellow, finely irrorated throughout with fuscous ; a narrow fuscous streak along costa from base to middle ; a narrow fuscous elongate mark on costa at three-fourths, from anterior extremity of which proceeds a fuscous streak to two-thirds of inner margin with a slight curve at extremity ; an irregular fuscous hindmarginal line, not reaching extremities ; cilia fuscous with a sharply defined yellow basal line. Hindwings with apex somewhat prominent, fuscous ; cilia as in forewings, but lighter throughout.

Allied to the preceding species, but apart from the narrower forewings it is immediately separated by the fuscous hindwings. Both this and the preceding species are allied to *prasinopis*, Meyr., Mackay and Rockhampton, Queensland. Seven specimens in November amongst dense scrub.

Preliminary Notes on Genyornis newtoni; a New Genus and Species of Fossil Struthious Bird found at Lake Callabonna, South Australia.

By E. C. Stirling, M.D., F.R.S., C.M.Z.S., Director, *

AND

A. H. C. Zietz, F.L.S., Assistant Director, South Australian Museum.

[Read August 4, 1896.]

Some account of the discovery of fossil remains at Lake Callabonna, by one of us, appeared in "Nature," 1894, Vol. L., pp. 184 and 206. Since then various circumstances which were alluded to at the time, besides considerable difficulties in connection with the restoration and treatment of the bones have retarded the development of the discovery and the publication of the results; nevertheless, though the work of dealing with a large mass of material is still far from complete, we find ourselves, at last, in a position to offer to this Society some preliminary notes upon the subject in respect of the remains of the large struthious bird which were found in association with bones of *Diprotodon* and other extinct marsupials.

As, in the course of this paper, reference will have frequently to be made to previous discoveries, in Australia, of bones of the same group of birds it will be convenient to commence our observations by a brief epitome of these.

That work has been materially facilitated by a paper by Mr. Robt. Etheridge, junr., who, in a paper in the "Records of the Geological Society of New South Wales," † succinctly reviews the history of the various discoveries of struthious birds in Australia. From this paper we have freely borrowed, and we accordingly express our thanks and acknowledgment.

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* Justice requires an acknowledgment on my part that to Mr. Zietz belongs the credit not only of having conducted the exhumations at Lake Callabonna, under arduous circumstances, but also of having most successfully carried out the tedious work of the restoration of bones which presented peculiar difficulties in treatment. I must be the first to admit that collaboration on my part has only been made possible by the patient and laborious exercise of Mr. Zietz's skill in this direction.—[E. C. S.]

† On Further Evidence of a Large Extinct Struthious Bird (*Dromornis*, Owen) from the Post-Tertiary Deposits of Queensland. R. Etheridge, jun., Vol. I., p. 126.

The first evidence of the former existence of these birds in Australia appears to have been in 1836, when "Sir Thomas Mitchell, F.G.S., Surveyor-General of Australia, discovered in the breccia-cave of Wellington Valley a femur," (13 inches in length), "wanting the lower end, having the lower ends mutilated, and encrusted with the red stalagmite of the cave, which I determined to belong to a large bird, probably, from its size, struthious or brevipennate, but not presenting characters which, at that time, justified me in suggesting closer affinities."* This femur is figured in Mitchell's work.†

In 1865 or 1866 (the alternative dates are given because both appear in two different notices by the author), at Penola, South Australia, the Rev. J. E. Tenison Woods came into possession of "two tibias and two tarso-metatarsal bones of some extinct and very large bird."‡

There is a further discrepancy in Mr. Woods' notices of the discovery in respect of the position in which the bones were found, for, in one place, he states that they were found "in sinking a well,"|| and, in another, that they were found "near a native well."§

In a subsequent reference ¶Mr. Woods provisionally proposed the name of *Dromaius australis* for this bird.

An important part of Mr. Woods's statements concerning it is the expression of his belief in its contemporaneity with man. He says in the first-mentioned notice that "It is certainly quite extinct, but appears to have been contemporaneous with the natives, for these bones are marked with old scars, one of which must certainly have been inflicted by a sharper instrument than any in the possession of the natives at present; there were, however, fragments of flint buried with the bones, and a native well about 50 yards away."

We have not been able to examine these bones, nor even do we know what has become of them. Perhaps they are among those fossils which, we understand, lie hidden in obscurity in the Penola Institute, and we propose to investigate the question. If, however, the statement of Mr. Woods concerning the contemporaneity of the bones with man can be substantiated it is one of

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* On *Dinornis*, Trans. Zool. Soc., Owen vol. VIII., p. 381; also Extinct wingless birds of New Zealand *(Dromornis australis)*. Appendix, p. 1.

† Three Expeditions into the Interior of Eastern Australia, 1838, vol. II., pl. 32, figs. 12 and 13; 1839 ed. pl. 51.

‡ Report on the Geology and Mineralogy of the South-Eastern District of South Australia by the Rev. J. E. Tenison Woods, p. 7.

|| *Ibid.*

§ Nat. History of New South Wales—An Essay, p. 27 (quoted from Etheridge, *op. cit*).

¶ Proc. Linn. Soc., N.S.W., 1883, VII., p. 387.

the greatest importance as affording, so far as we know, the only direct evidence of the coexistence of man in Australia with the extinct fauna.

Mr. Woods' description of the bones is not very clear, but a certain interpretation of it lends support to the view that the bones in question were those of the bird for which we shall propose the generic name *Genyornis*.

In 1869, the late Rev. W. B. Clarke, Government Geologist of New South Wales, announced, both to the *Sydney Morning Herald* (May 19) and to the *Geological Magazine* (Vol. VI., p. 383), the discovery of a femur (nearly twelve inches in length) during the digging of a well at Peak Downs in Queensland. As Mr. Etheridge points out there is, in this case also, some discrepancy in the statements as to the exact position in which the bone was found. This femur was determined by Mr. Krefft, then Curator of the Australian Museum, to be that of a *Dinornis*.

A cast of it, with photographs, was transmitted to Professor Owen who described it in detail and founded on it the genus *Dromornis*: summarized his conclusions as follows:—"I infer that in its essential characters this femur resembles more that bone in the emu than in the moa, and that the characters in which it more resembles *Dinornis* are concomitant with, and related to, the more general strength and robustness of the bone—from which we may infer that the species manifested dinornithic strength and proportions of the hind limbs, combined with characters of closer affinity to the existing smaller, more slender-limbed, and swifter wingless bird peculiar to the Australian continent."*

In 1876, again through the instrumentality of the Rev. W. B. Clarke, a fragment of a pelvis of a large bird, including the left acetabulum, found at a depth of 200 feet, at the Canadian Gold Lead, near Mudgee, N.S.W., was transmitted to Professor Owen, who assigned it to *Dromornis*.† In the same paper he describes a portion of a tibia, supposed to have come from a cave at Mt. Gambier, South Australia.‡ This also Professor Owen allocated to *Dromornis*, but remarks "one cannot of course state confidently that it is a bone of the same species as the mutilated femur from the cave of Wellington Valley, or of that of the drift at Peak Downs, in Queensland." We believe that this fragment may be assigned to *Genyornis*.

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* Trans. Zool. Soc. Vol. VIII., p. 383. Extinct wingless birds of New Zealand. Appendix, p. 13.

† Trans. Zool. Soc., 1877, Vol. X., p. 186. Extinct wingless birds of New Zealand. Appendix, p. 6.

‡ This was presented to the British Museum by the Trustees of the Adelaide Museum, 1872.—Brit. Mus. Cat. Fossil Birds, p. 356.

In the proceedings of the Royal Society of Queensland, for 1884 (Vol. I., p. 23), Mr. De Vis describes a fragment of the proximal end of a femur of a struthious bird that was discovered, with other bones, at King's Creek, in the Darling Downs district. In the author's opinion the characters of this fragment justify its reference to the genus *Dinornis*, and he accordingly assigned to its possessor the name *Dinornis queenslandiæ*. This conclusion has, however, been contested by so competent an authority as Professor Hutton, and no doubt requires the confirmatory evidence of more complete material.

In 1889 remains of a large struthious bird were found at an old spring, in sinking a well, at a depth of 20 feet from the surface at Thorbindah, near Cainwarra Station, on the Paroo River, Queensland, in association with fragments of bones of kangaroos, *Diprotodon*, and *Dromæus*, and forwarded to the Government Geologist by Mr. A. S. Cotter. These were described by Mr. Etheridge in the paper to which we have expressed our indebtedness as portions of "the right tibia and left fibula of a large struthious bird, and the right tibia of an emu;" both of the portions of the larger bones were assigned by the author to *Dromornis*.

As to the fragment of tibia, we can have no doubt that it belongs to the same bird as the Mount Gambier and Callabonna fossils; but to this matter we must recur. The fragment, however, believed by Mr. Etheridge to be a part of the fibula, is certainly not any part of that bone in the Callabonna bird, and, indeed, we cannot make it correspond to any part of *Genyornis* which we possess, nor, moreover, does it correspond to any part of any fossil bone with which we are able to compare it, whether of bird or mammal.

As we are dealing particularly with the larger forms of struthious birds, we do no more than mention, in this place, that fossil fragments of bones, which have been referred to the existing genus *Dromæus*, have been recorded from the Post-Tertiary deposits of the Wellington Caves and other localities. One such fragment, from the Darling Downs, of slightly larger dimensions than the living species *Dromæus norœ-hollandiæ*, constitutes the type of *Dromæus patricius*,* which name was accepted by Mr. Etheridge for the fragment found at the Paroo River with the larger bones.† So also a fossil representative of *Casuarius* (stated to be allied to *C. picticollis*, Lydekker, Brit. Mus. Cat. Fossil Birds), in the form of a distal portion of the tibio-tarsus, was also obtained in the cave deposits of Wellington Valley.

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* "A Glimpse of the Post-Tertiary Avi-fauna of Queensland," Proc. Linn. Soc. N.S.W., 1888, Vol. III., 2nd ser., p. 1277.

† Records Geol. Surv. of N.S.W., *loc cit.*, p. 133.

Up to this point these references are based upon published statements, which have been so conveniently summarised by Mr. Etheridge. We may now add to the list by a notice of some other discoveries in South Australia, which have either not yet been made public or which have only received a passing notice in the current press.

In 1879 the South Australian Museum received, from Mr. R. M. Robertson various collections of fossil bones found near Normanville, South Australia. Amongst these, which included remains of *Diprotodon*, *Macropus*, *Phascolomys*, *Bettongia* and *Thylacoleo*, were a portion of a femur and of two or three tibiæ. We are now able to refer all the latter to the Callabonna bird.

In 1889 one of us (A.Z.), in the course of the exhumation of *Diprotodon* bones at Baldina Creek, on the edge of the Eastern Plains, near Burra, South Australia, obtained a considerable portion of a femur, which can also be referred to the same species.

Lastly, in 1893, came the discovery, already noticed in "Nature,"* of a large number of bird-bones at Lake Callabonna found in association with those of *Diprotodon* and of other extinct marsupials. To the circumstances of this discovery, so far as it relates to the birds, a few further details will be given directly.

For convenience of reference we may now epitomise, in their proper order, the various discoveries of large bird bones which have been mentioned above.

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* *Loc. cit.*

Date.	Locality.	Colony.	Discoverer, or Author (in brackets).	Nature of Remains.
1836	Wellington Caves ...	N.S.W.	Sir T. Mitchell	Femur, mutilated
1865 or 6	Penola...	S.A.	Rev. J. E. Tenison Woods ...	Two tibiæ and two metatarsi
1869	Peak Downs (Dromornis)	Q.	Rev. W. B. Clarke	Femur
1876	Canadian Lead ...	N.S.W.	Mr. Dietz	Portion of pelvis
1876 or 7	Mount Gambier ...	S.A.	(Prof. Owen)...	Fragment of tibia
1879	Normanville	S.A.	Mr. R. M. Robertson ...	Portions of femur and of three tibiæ
1884	King's Creek	Q.	(Mr. C. W. De Vis)... ...	Portion of femur
1889	Paroo River	Q.	Mr. A. S. Cotter	Portion of tibia: of fibula?
1889	Baldina Creek... ...	S.A.	Mr. A. Zietz...	Portion of femur
1893	Lake Callabonna ...	S.A.	Mr. A. Zietz ... ... Mr. H. Hurst	Many bones, *vide infra*

Geological Age of the Various Bird Remains.

As to the geological age of the various bones Mr. Etheridge remarks :—"The femora" (Wellington Caves, Peak Downs and King's Creek) "and the tibia" (Mount Gambier) "coming from what may be generally termed Quaternary deposits may, for argument's sake, be considered of the same geological age. But it is questionable if the pelvis from the Canadian Lead can be so regarded. As previously stated it was found at a depth of 200 ft. in an auriferous lead of supposed Pliocene age, and it is therefore somewhat premature to class these remains as all of one period. Rather, would it not be better to consider the pelvis from the Canadian Lead as one of the earliest bird remains yet extant on this continent, and of Pliocene age ; and those from the other localities as representing a Post-Pliocene period." *

As to the Penola remains the discrepancies in Mr. Woods' statements as to their position have already been alluded to, but the expression of belief from a geologist in the contemporaneity of the bird with the natives and the distinct assertion, in one of his notices of the remains, that they were found "in one of the kitchen middens of the natives of South Australia. The bones were marked by the scrapings and cuttings of the flint knives of the blacks," at least implies a recent period. †

With regard to the Normanville and Baldina Creek fossils we are informed by Mr. Howchin that some uncertainty exists as to whether the deposits in which they were found should be regarded as Pliocene or Pleistocene.

At Callabonna the fossiliferous formation was determined by Professor Tate ‡ to be Pliocene.

The Discovery of Bird-bones at Lake Callabonna.

Some reference was made to the discovery of bird-bones in the papers in "Nature" already referred to, but it may not be without interest to add, in this place, a few further details. These we quote in the first person singular as proceeding from the one of us (A.Z.) who personally conducted the operations at Lake Callabonna.

"The level bottom of Callabonna Lake, the characters of which have been described,‖ shows, in some places, small elevations of about two square feet in size,§ formed of concretionary lime-

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* Op. cit., p. 129.
† Proc. Lin. Soc., N.S.W., 1882, Vol. VII., p. 387.
‡ "Nature," 1894, Vol. L., p. 207.
‖ "Nature," Vol. L., p. 187.
§ These elevations are distinguished from those covering the skeletons of Kangaroos and Diprotodons by their smaller size and by the presence of pebbles.

stone. These, when closely examined, were found to form incrustations for the more solid bird bones. Around, and above, these elevations were scattered numerous small smooth pebbles,* which were partly buried in drift sand. The elevations could still be recognised during the dry season, when the whole bed of the lake was covered with a white saline incrustation.

"The remains of the first two birds found were imperfect skeletons of which only the leg and toe bones (which were underground) could be removed, all the other bones being irretrievably damaged. Subsequently, when the clay bottom of the lake became sufficiently dry and hard for camel riding, I made a flying trip of two days duration to the north-western shore of the lake, about eight miles distant from our camp, where, I was told, bird bones had been noticed in greater number. The result of this trip, however, proved to be unsatisfactory, only a few bones being obtained and these in a very defective state.

"In the course of time, while proceeding with the exhumation of *Diprotodon* fossils near our permanent camp, single bird bones were frequently found mixed with those of the former animal; but in many cases they were destroyed before they were noticed. This was unavoidable, because, in order to gain access to the large *Diprotodon* bones which were to be removed, great masses of clay had to be shifted, and it was in the course of this removal that the accidental damage took place to the smaller and unnoticed bird bones which were disseminated in the clay. Judging from the frequency with which its remains were found, this bird must have been numerous at the time of its existence. During the second month's operations we discovered a nearly perfect sternum —the only good specimen obtained—and near to it other parts of a skeleton scattered throughout the clay. All, however, except the sternum were in a very bad condition. In the course of the third month a part of the lake, near our camp, which was, at the time of our arrival, partly under water and too boggy for work, became partly dry, owing to the continuance of dry northerly winds.

"To this place I decided to give a trial with the result that three bird skeletons, besides other fossils, were found lying close together and only about a foot below the surface. The first bone uncovered was a pelvis, and on following this up we came upon the vertebral column which was, however, in a hopeless state of decay; near the end of this was the lower jaw. Perceiving also, with great delight, parts of the skull, I decided to extract the whole mass of surrounding clay in which it was embedded. The second skeleton was in a similiar condition:—head only partly recognisable; pelvis good; sternum, both in this and the previous

* "Nature," Vol. L., p. 208.

specimen, broken up into fragments ; vertebræ little interrupted as a series, but each individual segment broken into minute fragments which made it impossible to remove them whole. One wing was nearly complete, but the bones of the other were only in fragments ; caudal vertebræ in fair condition. The legs of all the birds found were directed downward, and were in a flexed position. The lower end of the tibio-tarsus, the tarso-metatarsal and toe bones were invariably incrusted with hard limestone to the thickness of half an inch, which had to be chipped off, and in the course of removal of this crust some bones were injured. The lower ends of the legs extended to a depth of several feet under ground where water was always present. The third bird skeleton was rather incomplete :—head in fragments ; pelvis imperfect ; no sternum; the legs only were in good condition. The remains of these three birds were found within a space of about six square yards and, as they lay on one side, their heads and necks were directed towards the south-west—the deepest part of the lake bed. It may be mentioned that all the bones situated near the surface were always found broken up into innumerable fragments, which was due to the growth of tufts of fibrous crystals.

[We are indebted to Mr. E. F. Turner, Demonstrator of Chemistry at the University, for the following note on the constitution and formation of these crystals : — The material submitted consists of clay impregnated, and covered, with filiform crystals, which are composed of halite, together with smaller quantities of gypsum, glauberite and alunite. On saturating the mass of clay with water, and then allowing it to dry, the crystals again appeared on the surface—capillary attraction leading the saturated solution of the above salts to deposit, in the first place, the cubical crystals of common salt and the octahedral crystals of alunite ; these then become bound together by the prismatic crystals of glauberite and gypsum, the result being that a protruding mass of filiform crystals is formed.]

" Under atmospheric influences, in which dry conditions of the clay are succeeded by moist, these crystals are alternately formed, in and around the bones, and redissolved ; with the result that constant scaling takes place from their surfaces until at last the whole bone crumbles into fine powder. Or, short of this, the infiltration of the bones with so much salt confers on them such hygrometric properties that, even in an ordinary damp atmosphere, they become moist, and can only be dried with great difficulty ; while, on the other hand, in the very dry weather of the Australian summer they become brittle to an extreme degree. The shrinkage, on drying, and consequent cracking of the masses of clay, enveloping the bones, also constituted a cause of damage. To give some idea of the extent to which this took place it may

be mentioned that a block of clay, containing bones which filled a box about 15 inches square, developed cracks in two places each over an inch in width. Such facts will in some measure explain the difficulties and delays that have been experienced in connection with the restoration of these bones.

"It may perhaps be mentioned in this place that, on one occasion, the white incrustation of saline crystals which then covered the surface of the lake was completely blown off by the force of the wind, leaving bare the natural clay of its bed.

"The appearance on the surface of skeletons, particularly of *Diprotodon*, is, no doubt, to be explained by a similar and recurring action of the wind, which, at certain seasons, blows with great force and frequency on the desiccated surface of the clay itself. *Vide* 'Nature,' vol. L., p. 210.

"The position of the sternum was always indicated by the presence of the gravel masses, previously mentioned, which rested upon its concave (upper) surface, whether on, or below, the ground. Though a few fragments of birds' bones were obtained before my arrival on the field, nearly all of them were obtained towards the latter part of my stay. Short of an exact enumeration it may be stated that the material obtained comprises about six femora, three only being in really good condition, the others unfortunately much distorted, by pressure, or otherwise injured; the tibio-tarsi, tarso-metatarsi, and toe bones of about a dozen birds, the majority of these being now in an excellent state of completeness and preservation; one almost perfect sternum; one skull a good deal damaged with its hyoid bone, and parts of a second head with the greater portion of its lower jaw; one nearly complete wing, with portions of others; two ribs; one set of caudal vertebræ and three pelves—the latter being much broken, partly by rabbits in camp (*Vide* 'Nature,' vol. L., p. 210), partly in transit, and partly on account of the conditions just described."

Existing Nomenclature of the Large Australian Fossil Struthious Birds.

So far as this is concerned the position is as follows:—

The genus *Dromornis* was founded by Professor Owen, on the Peak Downs femur, and the author has, at least provisionally, referred to the same genus the first found femur of the Wellington Caves, the fragment of the pelvis of the Canadian Lead and the portion of the Mount Gambier tibio-tarsus. "The probabilities are" says Professor Owen, in a letter to Mr. Clarke,* "that the femur from the breccia cave of Wellington Valley, that described (from Peak Downs), your portion of a pelvis, and the South Australian tibia are parts of the same genus if not species. It is

* Journal and Proc. R. Soc. N.S.W., 1877, Vol. XI., p. 43.

more convenient and conducive to progress to regard them, until proof of the contrary be had, as parts of *Dromornis australis.*" This was somewhat qualified by a later statement already quoted, which very reasonably implied that it must still be an open question as to the specific identity of the Mt. Gambier tibia with the femora of the Wellington Valley and Peak Downs.*

The Kings Creek fragment of femur has been assigned by Mr. DeVis to the genus *Dinornis* as *D. queenslandiæ.*

For the Penola bones the Rev. J. E. Tenison Woods provisionally proposed the name *Dromaius australis* until more bones should be found, but "since then its remains have been found in other places, and Professor Owen has named it *Dromornis australis.*"†

Putting aside, as not immediately concerning us, the fossil forms of emeu, *Dromornis australis* and *Dinornis queenslandiæ* are thus the only two definitely named species of large extinct Australian struthious birds.

From an examination of the bones of the Callabonna bird, so far as this has proceeded, and, in the first place, from a comparison of its femur with these two named Australian species,‡ we believe we may assert that—

1. The femur of the Callabonna bird differs so considerably from that of *Dromornis* and *Dinornis queenslandiæ* that it must be regarded as that of a different bird, and, further, that the differences are sufficiently great to justify the establishment of a separate genus.

2. The Mount Gambier and the Paroo River tibiæ, assigned to *Dromornis* by Professor Owen and Mr. Etheridge respectively, are identical with that bone in the Callabonna bird. As to the supposed fragment of fibula from the latter locality, we have already expressed our doubts.

3. Of the portion of the Canadian Lead pelvis, we cannot yet express an opinion, as no comparison has yet been made with that of the Callabonna bird, which is, moreover, much damaged, and still in process of restoration.

4. The other South Australian specimens from Normanville and Baldina Creek are identical with corresponding parts of the Callabonna bird.

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* Extinct wingless birds of New Zealand. Appendix, p. 6.

† Nat. Hist. N.S.W., 1882, p. 27 ; (quoted from Etheridge) p. 135.

‡ We have to express our acknowledgement to Mr. Etheridge and Mr. DeVis, Curators, respectively, of the Australian and Queensland Museums for forwarding to the South Australian Museum casts of these two type specimens, and to Mr. Pittman, Director of the Geological Survey of New South Wales, for his courtesy in permitting us to examine the actual specimens from the Paroo River, described by Mr. Etheridge.

Now, as the name *Dromornis* rightly belongs to the Peak Downs femur on which the genus was founded, it becomes necessary to find a name for the Callabonna fossil, whose femur is different, and we propose the name *Genyornis* newtoni*. The generic name arises from the conspicuous feature afforded by the relatively large size of the lower mandible, which fact, at least, emerges from the, as yet, hardly commenced examination of the skull.

Under this name, therefore, we propose to include the various portions of tibiæ that have been hitherto assigned to *Dromornis*, leaving the identity of the Canadian Lead pelvis as yet undetermined.

Genyornis newtoni.

A detailed description of the bones of this bird, together with a comparative reference to the other forms with which it may be compared, and the necessary illustrations, are in course of preparation. In the meantime we submit the actual specimens to the Society, and beg to call attention to a few salient features that may give some indications of its characters and of its affinities, particularly with those Australian and New Zealand ratitite birds which are the first to invite comparison.

Femur.—This bone of *Genyornis*, in its bulk and massive proportions, claims comparison with that of the most ponderous of the moas. Though, as will be seen by reference to table I. the largest examples are nearly five inches shorter, yet, their latitudinal dimensions very nearly equal those of *Dinornis maximus*, while they considerably surpass those of *Pachyornis elephantopus*. From the the femora of Dinornithidæ that of *Genyornis* is, however, distinguished by the marked absence of prominent ridges and surfaces for muscular attachment that are often conspicuous features in the former family; by the flatness of the surfaces of the shaft; by the pyriform oval, or almost trilateral, shape of the section, and by the more considerable curvature of its internal border. It differs also in the more gradual and evenly curved ascent of its superior articular surface, as it recedes from the head to cover the trochanter. Yet notwithstanding, from the great lateral width of this surface, the trochanter rises to as great or to a greater elevation, relatively to the head, than obtains in the moas, where the ascent of the epitrochanteric surface is abrupt and steep. The femur of

*Γένυς, the under jaw. In the specific name we have much pleasure in dedicating this ancient bird to Professor Alfred Newton, F.R.S., Professor of Zoology in the University of Cambridge, whose name has been long intimately and honourably associated with the progress of ornithology and, from whom, both as teacher and friend, one of us has received much personal kindness and encouragement.

Genyornis differs also from that of these birds in the presence of alarge pneumatic foramen at the topmost part of the posterior surface of the upper expansion of the shaft. In this respect it resembles the femur of the emeu and ostrich, while it differs from that of the cassowary. Great differences are also observed in the shape and proportions of the great trochanter.

The inferior extremity is also characterised by its great breadth and, in conformity thereto, the width of the intercondylar groove in the largest examples exceeds by an inch that of the femur of *D. giganteus*, Owen."*

From the femur of *Dromornis* that of *Genyornis* is distinguished by its more massive proportions as shown in table I., and by some of the above mentioned characters, such as the shape of the section of the shaft (which in *Dromornis* is a flattened and regular oval) ; the marked curvature of the internal border; the presence of the pneumatic foramen and the shape and projections of the trochanter with its accessory processes. In one respect there is a resemblance to *Dromornis*, viz., in the gradual and even slope upwards of the superior articular surface towards the trochanter. So far as the mutilated condition of the *Dromornis* femur permits a comparison to be made there are also considerable differences in the details of the inferior extremity —particularly in respect of the contrast between the oblique, deep and narrow popliteal depression in this bone and the wider, shallower, and much less well defined cavity as it exists in *Genyornis*.

Whether further remains of the bird to which the fragment of femur, named *Dinornis queenslandiæ* by Mr. DeVis, belongs shall prove it undoubtedly to be an undoubted *Dinornis* or not, the sudden ascent of the trochanteric part of the articular surface of this bone in the Moas is in marked contrast to the feature that has been described for Genyornis. A further distinction in *D. queenslandiæ* is the considerable fore and aft projection of the trochanter which, in a smaller bone, gives a greater width of the postero-external trochanteric surface than in the larger femur of *Genyornis*.

* The South Australian Museum does not possess a femur of *D. maximus*.

Table I.

Table showing comparative measurements of the femora of *Genyornis newtoni*, *Dinornis maximus*, *Dinornis (Pachyornis) elephantopus*, and *Dromornis australis*.

—	*Genyornis newtoni*. No. 1.		*Genyornis newtoni*. No. 2.		*Genyornis newtoni*. No. 3.		*Dinornis maximus*, Owen.		*Dinornis elephantopus*, Owen. *Pachyornis elephantopus*, Lydekker.		*Dromornis australis*, Owen.	
	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.
Length	$13\frac{3}{8}$*	339	$13\frac{5}{8}$*	345	13*	322	$18\frac{1}{4}$	462	13	329	$11\frac{1}{2}$*	291
Breadth of proximal end	$6\frac{3}{8}$*	161	$7\frac{1}{8}$	180	$6\frac{3}{8}$	161	$6\frac{1}{2}$	164	$5\frac{13}{16}$	147	$5\frac{1}{4}$*	133
Breadth of distal end ...	7	177	$6\frac{3}{4}$	171	$6\frac{3}{8}$	161	$7\frac{1}{2}$	190	$5\frac{11}{16}$	149	5*	126
Circumference at middle	$9\frac{1}{4}$	234	$9\frac{1}{4}$	234	$8\frac{5}{8}$	218	$9\frac{1}{2}$	240	$7\frac{3}{4}$	196	$6\frac{3}{4}$	171

For convenience of reference the measurements are given both in inches and millimetres.

The asterisk indicates that the measurements so marked are slightly curtailed by reason of abrasion of the bones.

Nos. 1 and 2 of *Genyornis* represent a pair of bones.

The measurements of *D. maximus*, *D. elephantopus*, and *Dromornis* are from Professor Owen's Table of Measurements, Trans. Zool. Soc., vol. VIII., p. 371.

The *Tibio-tarsus*, which in point of size may be compared with that of Pachyornis elephantopus (*vide* Table II.), is brought into line with the Dinornithidæ by the presence of a supra-condyloid extensor bridge, but this is in *Genyornis*, nearly median in position, instead of being near the inner border as in the former family.

The statement previously made, which assigned the Mount Gambier and Paroo River tibias to *Genyornis* now requires some further explanation. For, in Professor Owen's description of the former fossil,* he states that of the "bridge there is no trace . . . . . and there is no evidence of fracture of the piers of such a

* Trans. Zool. Soc., vol. VIII., p. 381., also Extinct wingless birds of N.Z., appendix, p. 5.

bridge. The margins of the groove whence the bridge springs in *Dinornis* are in *Dromornis* broadly convex and entire." And again, in Mr. Etheridge's paper so frequently referred to,* it is stated, in speaking of the Paroo River fossil, that "the rounded edge of the precondylar groove at that point in the present bone, whence in *Dinornis* the piers of the bony bridge, or oblique bar would spring, are much worn away, and would at first convey the impression that a similiar structure had here existed. By following the general contour of the groove, however, and comparing with this the mechanism in a *Dinornis* tibia it is quite apparent that such a structure could not have existed in the present instance, and we are therefore dealing with a true *Dromornis* bone." Now the preciseness of these statements and the sources from which they emanate are of such a character that it requires some assurance to suggest that they have been made in error. Further, we should have ourselves to admit that, had our own notice been based upon some of the Callabonna bones, we should have been compelled to make a similiar assertion as to the absence of a bony bar. We have specimens in which the margins of the groove at the site of the bridge are so worn as to leave no trace of the previous existence of such a structure. Fortunately, however, in one specimen the bridge is *in situ* and perfect in its form and attachments; in two others the osseous attachment to one pier is intact though, on the opposite side of the groove, a narrow gap, extending though the whole width of the bar, separates the end from its corresponding pier; in others, though the bridge itself is absent, the condition of the margins clearly indicates its former existence. Mr. Pittman, Director of the Geological Survey of New South Wales, has very courteously forwarded the Paroo River fragment for our examination, and we find that the appearances presented by the piers in this bone are exactly paralleled by those of some of the Callabonna tibiæ. We have, therefore, no hesitation in asserting that the bar was once present in this bone also.

As to the Mt. Gambier specimen described by Professor Owen, we are only able to refer to his plate. The margins of the groove where the bridge ought to be are there certainly shown as in a very worn condition, but not more so than in some of our own specimens, while there is so close a correspondence in other details of the bone that we have no doubt of its identity with the tibia of *Genyornis*.

In the tibio-tarsus of *Genyornis* there is a much more abrupt inward deflection of the tendinal groove, which takes place just at the place where it is spanned by the bridge, than we find in

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* *Op cit.*

any of the Dinornithidæ. The Callabonna tibia is, moreover, characterised by a very marked inflection of the lower end of the shaft, and particularly by the incurvature of its inner border—these features being markedly in excess of those which obtain in Pachyornis. A very conspicuous feature of the *Genyornis* tibia is the massive proportions of the cnemial process, the elevation above the articular surface to which it reaches and the marked recurvature of the ecto-cnemial ridge to the extent of forming what might be described as a hamular process. In this combination of characters there is a much greater resemblance to the emeu than to the Dinornithidæ.

TABLE II.

Table showing comparative measurements of the Tibio-tarsi *Genyornis newtoni* and *Dinornis (Pachyornis) elephantopus.*

	Genyornis newtoni.		*Dinornis elephantopus* Owen. *Pachyornis elephantopus*, Lydekker.	
	Inches.	Mm.	Inches.	Mm.
Length	$23\frac{3}{4}$	602	24	608
Breadth of proximal end ...	$7\frac{5}{8}$	193	$7\frac{5}{12}$	187
" " distal end ...	4	101	$4\frac{1}{6}$	105
Circumference at middle ...	$6\frac{3}{4}$	164	$6\frac{5}{12}$	162

The *Genyornis* tibia belongs to one of the large pair of femora of the preceding table, and the measurements of that of *D. elephantopus* are from Owen's table.

The *tarso-metarsus* equals in length that of *Dinornis ingens*, Owen, but its latitudinal measurements are superior to the latter, in all respects except in that of the width of the distal end. Beyond this relative narrowness of the combined trochleæ these elements are, in *Genyornis*, distinguished by their inequality of size—the inner being only half the width of the outer and very slightly shorter and the outer only two-thirds of that of the mid-trochlea. The surfaces that bound the trochlear interspaces are markedly concave, and there are two perforations through the bone just above the outer trochlear interspace. In these features there is a closer resemblance to the emeu than to the cassowary,* in which latter there is nearly equality of size between the inner and outer trochleæ and no perforation in the interspace, while in the former there is a single perforation. In general proportions, however, there is a nearer approach to the latter bird than to the

* *Casuarius australis.*

more slender-legged emeu. The marked trilateral character of the transverse section of the upper half or two-thirds of the bone, and the deep longitudinal grooving of the corresponding anterior surface, constitute conspicuous features and, to some extent, further points of resemblance to both emeu and cassowary. The hypotarsus is thick, prominent and undivided.

No sign of the attachment of a hallux appears.

Table III.

Table showing comparative measurements of the tarso-metatarsi of *Genyornis newtoni*, *Dinornis novæ-hollandiæ* (*ingens*), Owen, and *D. gracilis*, Owen.

—	*Genyornis newtoni.*		*Dinornis novæ-hollandiæ*, Owen. *D. ingens*, Owen.		*Dinornis gracilis* Owen.	
	Inches.	Mm.	Inches.	Mm.	Inches.	Mm.
Length	$13\frac{3}{4}$	348	$13\frac{3}{4}$	348	13	329
Circumference at middle ...	$5\frac{5}{8}$	135	$4\frac{1}{2}$	114	$4\frac{1}{4}$	107
Breadth (tranverse) of distal end	$3\frac{1}{2}$	88	$4\frac{1}{2}$	114	$4\frac{1}{4}$	107
Transverse breadth at middle	$1\frac{7}{8}$	47	$1\frac{7}{12}$	40	$1\frac{7}{12}$	40
Antero-posterior breadth at middle	$1\frac{1}{2}$	38	$1\frac{1}{4}$	32	$1\frac{1}{6}$	30
Breadth of proximal end ...	$3\frac{3}{4}$	95	$3\frac{1}{2}$	88	$3\frac{1}{3}$	84

The *Genyornis* tarso-metatarsus does not belong to the same bird as the femur and tibio-tarsus. The measurements of the other bones are from Owen's table.

Toes.—The toes of the tridactyle foot are remarkably short in comparison to those of the Dinornithidæ, the middle one being only just as long, and the inner and outer hardly more than an inch longer than the respective digits of the emeu. In relative size they conform to the proportions of the corresponding trochleæ, and in the great slenderness of the inner toe we have another point of resemblance to *Dromæus*. This digit is further characterised by the lateral compression and great relative length of its proximal phalanx; the lengths of the three proximal phalanges of an average specimen being as follows:—Inner, 80 mm.; middle, 73 mm.; outer, 65 mm. The phalanges of the middle and outer toes, on the contrary, are characterised by their breadth and depression. The, ungual phalanges, in particular are small, short and flat—features which are in marked contrast with the long, pointed and curved, conical claw-bearing phalanges of the Dinornithidæ, or even of those of the emeu and cassowary. In conformity with the shape of the constituent segments (except

in the case of the inner toe) the surfaces of the phalangeal joints are characterised by their transverse width and low vertical height; by their comparative flatness, and by the insignificance of the depressions for the lateral ligaments—a combination of characters which indicate weakness of the toes, in addition to the shortness and feebleness of the claw-bearing phalanges.

One other important feature remains to be indicated. From all other ratitite forms, and from nearly all other birds, the outer toe of *Genyornis* differs in possessing only four segments in place of five. Of this unusual feature the one of us (A.Z.) who gathered the bones assured himself repeatedly by counting them *in situ*.

Sternum.—The restoration of this bone is not yet quite completed, but, so far as can be seen in shape and proportions, it resembles that of the emeu more closely than it does that of the cassowary, while it differs considerably from that of the Dinornithidæ. We think we may confidently assert that neither lateral xiphoid processes nor median post-axial notch exist.

The actual dimensions may be thus approximately stated:—Extreme length, 12 inches; extreme transverse breadth, allowing for a slight deficiency, $10\frac{1}{2}$ inches. The corresponding measurements of the sternum of the emeu and cassowary *(C. australis)* being respectively $4\frac{1}{2}$ and 4 inches, and 8 and $5\frac{1}{2}$ inches.

Wings.—By the fortunate recovery of several elements of wings we are able to establish the possession of small appendages of this character for *Genyornis*. The humerus, radius, ulna, two meta-carpals, and one phalanx are represented either by complete bones or by fragments. The whole length is approximately $9\frac{1}{4}$ inches, and the proportions, on the whole, more nearly those of the emeu than the cassowary.

Head.—As to the head, of which both specimens obtained are unfortunately in a very dilapidated condition, we prefer not to speak at present, except to indicate its large size. The total length of the skull is $11\frac{1}{2}$ inches, that of a large emeu and ostrich being respectively $6\frac{1}{2}$ and 8 inches.

As concerns the size of the lower mandible, from which feature the bird has received its name, we may mention that the ramus, slightly imperfect at its posterior extremity, is $10\frac{1}{2}$ inches, and its width at the widest part $2\frac{1}{2}$ inches. The symphysial depth is $1\frac{1}{2}$ inches. For a large ostrich and emeu the corresponding measurements are respectively, in inches, $7\frac{1}{4}$, $3\frac{1}{4}$, $\frac{5}{8}$; and $5\frac{3}{4}$, 3, $\frac{7}{16}$. The transverse span, posteriorly, of the lower mandible is, at least, 6 inches, while that of the ostrich and emeu is $3\frac{1}{4}$ and 3 inches respectively.

Thus far, in our brief description, we have made comparisons only with Australian and New Zealand ratitite birds existing and

fossil. Two other extinct forms invite comparison, viz., *Gastornis parisiensis*, from the Eocene beds of Meudon, near Paris, and the *Æpyornis maximus*, of Madagascar; but, for the present, we must content ourselves with saying that, though in that characteristic part—the lower end of the tibia—there are points of resemblance between *Genyornis* and *Gastornis*, yet, so far as can be judged by reference to plates and descriptions, which are our only means of comparison in the case of *Gastornis*, we believe the differences in respect both of the characters of the femur and tibio-tarsus, to say nothing of the difference of geological horizon, are sufficient to preclude even a generic association between the two forms.

Between *Genyornis* and *Æpyornis* there are many conspicuous points of difference; though it is noteworthy that, in point of great breadth as compared to length, the femur of *Genyornis* makes a nearer approach to that of *Æpyornis maximus* than the thighbone of any other bird with which we are acquainted.

Conclusions.

Though in the absence of a careful study of so important a part of the organization as the head, it is perhaps premature to offer decisive opinions as to the habits of the bird or of its affinities with existing members of its group, nevertheless the following conclusions appear to be justified by the survey of its remains so far as this has been made.

The great size of the femur and tibio-tarsus, no less than of its sternum, indicate its massive build, though there is a strange disproportion between the proportions of the upper leg bones and the relatively slender tarso-metatarsus. Its legs combine a huge femur nearly as massive, in all but length, as that of *Dinornis maximus*, and a tibia equalling that of *Pachyornis elephantopus* with the comparatively slender metatarse of *Dinornis novæ-hollandiæ (ingens)* and toes whioh are insignificant beside any of the larger moas. The absence of prominent rough surfaces or ridges for muscular attachment, lead one to assign to it a slow sluggish habit. In height it may be confidently stated to have been from 6 feet to 6 feet 6 inches, that is if the neck should have been of proportions similiar to those of *Pachyornis elephantopus*. With the large size of the head, however, may be correlated modifications of the neck. The small flat ungual phalanges would appear to have borne flattened nails, rather than sharp and powerful claws, which could have been of little service for scratching purposes and with this feature is associated an evident want of strength in the phalangeal joints.

There is reason to believe that the *Diprotodon* may have been a swamp-loving animal which, tapir-like, may have haunted the shores of the lacustrine areas of Central Australia in Pliocene

times, and the association of the remains of *Genyornis* with those of *Diprotodon* suggest that the bird, too, may have had its haunts, and found its food, by the same swamps as its bulky marsupial associates. The thickness of the lower jaw is scarcely commensurate with its great length and depth, and this fact, with the weakness of the toes, suggest that, like the emeu, herbage, rather than roots, may have formed its food.

In the course of our brief description and comparisons it will have been seen that the resemblance to the emeu, and to a less extent to the cassowary, are many and considerable. The presence of the bony bridge being, however, a conspicuous, if not morphologically important, point of difference. The emeu, in fact, appears to be its nearest ally, though there are points of resemblance, other than in respect of bulk, to the *Dinornithidæ*, and possibly it may be found to the *Gastornithidæ*. We may, perhaps, provisionally regard it as an ancestral form of emeu, possibly having relations to the New Zealand group.

As will be seen in table I. certain differences in size exist between the femora of two individuals, and these are not confined to that bone; but we do not believe that, either in this respect or in the details of structure, there will be found grounds for thinking that more than one species is represented in the Callabonna collection.

Of its relations to existing forms, other than those of the ratitite type which have been mentioned, it is premature to speak; such facts will emerge with greater certainty and completeness on a study of the head, the restoration of which—a long and tedious task—is approaching completion, though, unfortunately, it is in a very imperfect condition. In the meantime we believe we have, in this preliminary notice, sufficiently indicated, though in a manner less complete than we could have wished, the interesting nature of the discovery at Callabonna, not only as affording additional evidence, in so much more complete a form than has hitherto existed, of the wide range in Australia of this race of great extinct birds, but also as bearing upon the phylogenetic relations of the sub-class to which it belongs, as well as, possibly on the question of the former distribution of land in the Southern Hemisphere.

These points, however, must be left to a subsequent communication, and, perhaps, to those with a wider range of knowledge than is possessed by the authors of this paper.

Genyornis newtoni—a Fossil Struthious Bird from Lake Callabonna, South Australia.

Description of the Bones of the Leg and Foot.

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and
A. H. C. Zietz, F.L.S., Assistant Director South Australian Museum.

Plates III., IV., and V.

[Read October 6, 1896.]

A preliminary notice of this bird appeared in the Transactions of the Royal Society of South Australia, vol. XX., p. 171. In the present paper we offer the first part of that which, when complete, will be a detailed description of all those parts of the skeleton which we possess. We commence with the bones of the leg, as the restoration of these is now nearly finished. Further notices will appear as other bones become available for description.

Femur:—Of these bones three only are in anything like perfect condition. A fourth, though nearly entire, is much flattened by antero-posterior compression, and others are still more distorted or imperfect. That which has principally served as the type for description is No. 3 of Table I. Though the dimensions of this are somewhat smaller than those of the large pair comprising Nos. 1 and 2, it is in a better state of preservation than either of the latter—indeed, save for slight abrasions affecting the summit of the trochanter, and for depressed areas on the upper part of the hinder and the lower part of the front surface, the anatomical details are almost perfect.

The head approximately equals, but does not exceed, the proportions of a hemisphere; and the part corresponding to the neck is but feebly defined by a very trifling constriction, which does not, however, involve the superior aspect. The non-articular part of the under surface of the neck, as it ascends, encroaches somewhat on the otherwise nearly hemispherical head. The depression for the round ligament is shallow, and situated well upon the upper surface of the head (Pl. iii., fig. 3, *A*). The superior articular surface, after descending from the summit of the head, ascends, as it recedes outwardly to cover the trochanter,

with a very gradual and slightly curved incline* (Pl. iii., fig. 2 *C*)—a feature which is in marked contrast to the more abrupt and steeper rise of this process in *Dinornis*. Nevertheless, owing to the great lateral width of the upper extremity of the bone and the consequent length of the incline, the summit of the trochanter, even in its slightly abraded condition, reaches to quite as great a relative height above the head, as in the New Zealand birds.

When a proximal view of the superior extremity is presented (Pl. iii., fig. 3) it will be seen that there is no projection posteriorly of the hinder surface of the trochanter, such as there is both in the New Zealand *Dinornis* and in *D. queenslandiæ*. Thus, whereas in the last named birds and, to some extent also, in *Dromornis*, the posterior margin of the upper articular surface forms a well-marked indented curve. In *Genyornis*, however, it forms nearly a straight line up to the point where the contour of the trochanter sweeps forward (Pl. iii., fig. 3, *upper border of figure*). The same figure will indicate the manner in which the mass of the trochanter is projected forwards and outwards (*B*).

In *Dinornis* the pre- meets the postero-external trochanteric surface at an acute angle, and the crest, corresponding to their line of union and terminating below in the ecto-trochanteric tuberosity, is sharp, prominent and laterally compressed. In *Genyornis*, on the other hand, the conditions may, perhaps, be best described as being such as are produced by the inclination towards one another of two plane, or, at most, very slightly concave, surfaces (pre- and ecto-trochanteric) at little less than a right angle, the angle along the line at which these two surfaces meet being at the same time broadly rounded off, instead of forming a prominent crest. Thus, though the anterior production of the trochanter is considerable, the process lacks the lateral compression, which is a conspicuous feature in all the *Dinornis* femora to which we have access. An obscurely indicated rough surface, rather than a distinct ecto-trochanteric tuberosity, marks the subsidence upon the shaft of the anterior trochanteric prominence (Pl. iii., fig. 1 *E T*). The pre-trochanteric surface (Pl. iii., fig. 1 *D*) is nearly flat, and does not present an oblique line or ridge, nor the conspicuous subcircular area for muscular attachment, which is shown in various *Dinornis* femora. The latter feature may, however, be represented by an irregular elevation, obscurely represented in Pl. iii., fig. 1, at the junction of the anterior and inferior surfaces of the neck close to the head.

* In Pl. iii., fig. 1, the steepness of the ascent of the trochanteric part of the articular surface is much exaggerated owing to the foreshortening, in the photograph, of the anterior projection of the mass of the trochanter itself.

From the absence of production posteriorly of the trochanter, the width of its postero-external surface is relatively less broad than in *Dinornis* and, though protuberant and roughly striated externally, it presents no marked depressions or elevations. On the outer surface of the trochanter an obscure, obtusely angular ridge runs from its summit obliquely downwards and backwards.

A feebly-marked intermuscular ridge (Pl. iii., fig. 1 *F*) beginning to the inside of the rough surface, which corresponds to the ecto-trochanteric tuberosity (Owen), descends vertically for two inches, and then inclines inwards to merge into a ridge which leads to the front of the ento-condyle. Immediately to the outside of the point where the inclination inwards takes place is a slightly elevated rough surface which is scarcely manifest in the figure.

The posterior surface of the upper expansion of the bone has undergone some amount of distortion by the depression of a considerable area of its outer crust—(Pl. iii., fig. 2 *G*), but the other femora show this tract and, indeed, the whole of the posterior surface to have been very flat. The posterior margin of the upper articular surface, as this begins to rise on to the trochanter, projects considerably so as to form an overhanging ridge. Directly below this ridge is a large deep oval depression (Pl. iii., fig. 2 *H*) which is clearly a pneumatic orifice. Two large foramina, separated by a bony septum, lead from the bottom of the depression into the interior of the bone.

The shaft is remarkably smooth and, with the exceptions above mentioned, is devoid of the prominent muscular ridges, rough surfaces or elevations that characterise Dinornithine femora; particularly, on the posterior aspect, is there an absence of lineæ asperæ. One very small nutrient foramen is present at about the centre of this surface.

A characteristic feature of this bone is the marked curvature of its internal contour (Pl. iii., figs. 1 and 2) in which respect it contrasts with the more open curve in the femora of *Dinornis* and *Dromornis*. The flatness of the posterior surface has been mentioned; to a hardly less extent the anterior and exterior surfaces are flat also, while the inner is rounded. Thus the transverse section in the middle of the shaft is a pyriform oval with the small end corresponding to the inner surface, or it might almost be described as trilateral.

The lower extremity, of which an area of the crust on the front surface has been depressed (Pl. iii., fig. 1 *G*) is, like the upper, characterised by its great transverse breadth—the smallest of the Callabonna bones exceeding, in this respect, the corresponding measurement of a femur of *Dinornis giganteus* (Owen), in the Museum collection, having a length of 15 inches, while the

similar width in the largest approaches to within half an inch of that of *Dinornis maximus* (Owen) with a length of $18\frac{1}{4}$ inches. Conformably to the great width of the lower extremity is the breadth of the rotular channel ($2\frac{7}{8}$ inches) (Pl. iii., fig. 4 *R C*) which also slightly exceeds the breadth of this channel in the femur of *D. giganteus* (Owen). At the same time the channel is, in *Genyornis*, relatively shallow. The anterior intercondylar ridge is very slightly indicated (Pl. iii., fig. 4 *N*), while the posterior is narrow and prominent (Pl. iii., fig. 2 *O*); the region corresponding to the intercondylar fossa is prominent rather than depressed.

Owing to the gentle inclination of the posterior surface of the shaft, as it leads into the popliteal fossa (Pl. iii., fig. 2 *J*), this depression is ill defined as to its superior contours, and the external and internal ridges which bound it laterally are broadly rounded, especially the former. The floor of the fossa is flat, but rough, and there are large pneumatic orifices arranged in a row along the lower margin (Pl. iii., fig. 2, above *O*). The larger depression seen at a higher level is probably accidental, as it does not appear to exist in the other bones. The open and shallow characters of the fossa in this bone contrast with the better defined, oblique, deep and narrow cavity in *Dinornis*. Commensurate also with the great breadth of the lower end is the width of the ento-condyle (Pl. iii., fig. 4 *I C*), of which the contour of the posterior margin forms nearly a horizontal line (*M*) before it dips suddenly to become the internal margin of the posterior intercondyloid notch (*K*); the contour of this notch forms a U-shaped figure instead of a more open curve.

Of the ecto-condyle (*E C*) the tibial moiety is also relatively wide, exceeding, in this respect, the corresponding part in *Dinornis giganteus*, and the fibular groove, is continued fowards for a considerable distance on to the front of the ecto-condyle; just behind the posterior limits of the groove there is an irregularly elongated ecto-condylar fossa (Pl. iii., fig. 2 *P*). The depression on the outer surface of ecto-condyle is inconspicuous, beside that to be observed on most Dinornithine birds. The ecto-condyle, moreover, when the bone is held vertically reaches a considerably lower level ($1\frac{1}{4}$ inch) than the ento-condyle; thus to place the bone in the position that the most inferior part of each condyle rests upon the same horizontal level involves a very considerable obliquity of the shaft.

Except in respect of size, all the Lake Callabonna femora resemble one another so exactly, that there can be no doubt that they belong to the same species. We have elsewhere expressed the opinion* that two fragments of femora from

* Trans. R. Soc., S.A., vol. XX., p. 175.

Normanville and Baldina Creek, S.A., are also to be attributed to the same bird, but it should be stated that, though corresponding with the Callabonna femora in all anatomical details which are available for comparison, the former fragments are parts of bones of distinctly less size than the smallest of the latter, as shown by the fact that their circumference, at the part corresponding to the mid point of the entire bone, is nearly an inch and a half less. In the portion from Baldina Creek, however, enough of the bone exists to permit of a comparison in many details, and in these as stated, no essential differences can be detected.

TABLE I.

Showing dimensions of femora of *Genyornis newtoni* compared with those of some other femora.

—	Length.		Breadth of proximal end.		Breadth of distal end.		Circumference at middle.	
	Inches.	Mm.	Inches.	Mm.	Inches.	Mm.	Inches.	Mm.
Genyornis newtoni, No. 1	$13\frac{3}{8}$*	339	$6\frac{3}{8}$*	161	7	177	$9\frac{1}{4}$	234
Genyornis newtoni, No. 2	$13\frac{5}{8}$*	345	$7\frac{1}{8}$	180	$6\frac{3}{4}$	171	$9\frac{1}{4}$	234
Genyornis newtoni, No. 3	13*	322	$6\frac{3}{8}$	161	$6\frac{3}{8}$	161	$8\frac{5}{8}$	218
Dromornis australis, Owen	$11\frac{1}{2}$*	291	$5\frac{1}{4}$*	133	5	126	$6\frac{3}{4}$	171
Dinornis maximus, Owen	$18\frac{1}{4}$	462	$6\frac{1}{2}$	164	$7\frac{1}{2}$	190	$9\frac{1}{2}$	240
Dinornis elephantopus, Owen ... (*Pachyornis elephantopus* Lydekker) ...	13	329	$5\frac{10}{12}$	147	$5\frac{11}{12}$	149	$7\frac{3}{4}$	196
Æpyornis maximus, I. Geoffroy	$12\frac{5}{8}$	320	$6\frac{5}{8}$	170	$7\frac{1}{2}$	190	$10\frac{5}{8}$	270

For convenience of reference the measurements are given both in inches and millimetres.

The asterisk indicates that the measurements so marked are slightly curtailed by reason of abrasion of the bones.

Nos. 1 and 2 of *Genyornis* represent a pair of bones—the largest in the collection.

The measurements of *D. maximus* and *D. elephantopus*, are from Professor Owen's Table of Measurements, Trans. Zool. Soc., vol. VIII., p. 371; those of *Æpyornis* from Oiseaux des Iles Mascareignes A. Milne Edwards, p. 96; and those of *Dromornis* partly from Owen's description, Extinct Wingless Birds of New Zealand, Appendix p. 2, and partly from a cast.

Tibio-tarsus.—Of these bones two only, viz., those belonging to the large pair of femora, Nos. 1 and 2 of Table I, are undis-

torted and nearly perfect, having suffered only some abrasion of the procnemial crest; in two others the full length has been preserved, but they are considerably crushed and distorted. In four it has been possible to restore the whole length of the shaft, but the processes of the upper extremity are absent. The remainder, sixteen in number, are represented only by the lower end, usually in good condition, with more or less of the shaft.

The ento-condylar surface (Pl. iv., fig. 5, *I C*) is suboval and nearly flat in its longer axis, which is directed obliquely from behind forwards and inwards. In the shorter axis it is slightly concave.

The ecto-condyle (Pl. iv., fig. 5, *E C*) is smaller in size, markedly convex, and oval, with its longer axis nearly at right angles to that of the entocondyle. An ill-defined intercondylar channel, scarcely to be distinguished in the figure, separates these two surfaces posteriorly and follows the contour of the ecto-condyle in a direction forwards and outwards to the ecto-cnemial cavity. (Pl. iv., fig. 5, *ɔ*). There is a prominent smooth intercondylar eminence (Pl. iv., fig. 5, *A*) the inner slope of which forms part of the entocondylar surface. The eminence also bounds the intercondylar channel in front and, in part, the cnemial or rotular channel (*B*) posteriorly. The posterier margin of both articular surfaces overhang the shaft considerably.

In front of the cnemial channel, which is wide and shallow, the massive cnemial process (Pl. iv., figs. 1, 3, 4, 5) rises to nearly three inches, measured vertically, above the level of the articular surface, this great height of the process being contributed to by the extension of the upper end of the procnemial ridge above the level of the epicnemial crest (Pl. iv., figs. 1, 3, 4 *F*). The procnemial ridge is thick at its upper part, but soon narrows as it descends to a much laterally compressed crest (Pl. iv., figs. 1, 3, 5, *F*), which, even in its somewhat damaged condition, is very prominent; this is continued down the front of the shaft to a point nearly six inches below its summit. About this point the crest subsides to a low, but still well marked, ridge, which is continued obliquely downwards and inwards till it almost reaches the inner margin of the anterior surface of the shaft at a little below the middle of the bone (fig. 1, *K K*). From this level the ridge extends vertically downwards for about four inches, but with diminished prominence, lying just external and parallel to the inner margin of the front surface of the shaft. Finally the ridge acquires increased prominence, inclines outwards and eventually becomes continuous with the inner border of the supracondylar extensor groove (figs. 1, 6, *L*).

The epicnemial crest (using the term to include the whole upper border of the cnemial process, exclusive of the procnemial

summit), when viewed superiorly, forms an open sigmoid curve (Pl. iv., fig. 5, *E E H)*, which is so inclined that its lower and outer end is considerably below the level of its upper and inner. The former end terminates by a marked backwardly directed curve *(H)*. In fact, the external angle of the cnemial process might be described as forming a backwardly directed hamular process, the inferior border of which forms the beginning of the ectocnemial ridge (Pl. iv., figs. 1, 4, *H G)*. This ridge, or crest, is continued downwards, with an inward trend, to a point which lies about four inches below the point of the hamular process; here it subsides upon the shaft, having at its termination approached to within an inch of the procnemial ridge.

Internally the cnemial process is bounded by a thick and rounded border (Pl. iv., figs. 3, 5 *D)* formed by the meeting of its posterior surface with the internal surface of the procnemial crest. This border descends abruptly from the summit of the process, but with an inclination backwards and inwards (figs. 3, 5, *D)*. On meeting the upper expansion of the bone this descending border becomes continuous with the adjacent, somewhat elevated and ridge-like anterior margin of the inner part of the rotular channel. There is thus no considerable extension of the epicnemial crest beyond, and to the inside of, the procnemial as in *Dinornis;* the latter ridge, in fact, springs from the interior surface of the former quite close to the thick and abruptly descending inner border that has been described.

Owing to the posterior incurvation of the angle formed at the junction of the epicnemial and ectocnemial crests, the ectocnemial cavity lying between this angle and the outer margin of the ectocondyle forms a deeply indented bay (fig. 5, opposite *J*), of which the arms approach one another to within two and a half inches.

No distinct supra-fibular facet is observable; in fact, when the fibula, which nearly certainly belongs to one of the large pair of tibio-tarsi, is placed in position, the head of the former does not touch that of the latter by nearly half an inch. The fibular ridge begins, as a low rising, two inches below the overhanging external edge of the ectocondylar surface, the interval being smooth and deeply concave in a vertical direction. An inch and a half below its beginning the ridge widens into a rough and nearly flat elevated surface, of fusiform outline, for articulation with the fibula (Pl. iv., fig. 4, *O O*). This surface, which is four inches long by five-eighths of an inch broad, appears to represent the whole extent of the direct articulation between the two bones. A smooth interval of about an inch succeeds this surface, and below this again an ill-defined broad, rough ridge that represents the external surface of the shaft, proceeds to the lower outer condyle. The opening of a larg

nutrient artery, directed distalwards, and to which a groove leads from above, lies just behind the lower end of the articular surface that has been described.

On the antero-internal aspect of the upper expansion of the bone an obtusely angulated ridge descends for four inches from the corresponding margin of the articular surface. This ridge terminates in a roughened convex tuberosity (Pl. iv., fig. 2, *P*). The tract between this ridge and the procnemial crest is nearly flat, or only very slightly concave in its upper part, where the surface is uninjured; the lower part has suffered some depression from injury.

Above the level of the (lower) fibular articulation the shaft is sub-quadrangular in shape, and at the same time somewat antero-posteriorly compressed. This latter characteristic continues throughout the rest of the shaft, but below the fibular surface the sub-quadrangular section becomes more of a pyriform oval, the smaller end being external; at the lower end the section tends to become again somewhat quadrilateral. The lateral width which, at the upper level of the fibular articulation, is $3\frac{1}{8}$ inches, diminishes in the descent to $2\frac{1}{8}$ inches at the narrowest part of the bone, which is 5 inches above its lower end; below this there is a slight increase of width as the shaft expands into the condyles. There is also a slight diminution of the antero-posterior diameter of the shaft in passing from above downwards.

At a little above the point at which the bone has been described as narrowest, laterally, there begins a marked deflection inwards of the lower end of the shaft, and the inflection affects the inner border to a greater extent than the outer. The result is to cause a considerable production inwards of the inner condyle. There is, at the same time, a slight but marked deflection forwards of the lower extremity. These features are shown in the whole length figures of the bone.

Of the lower expansion the inner condyle projects more, both anteriorly and posteriorly (Pl. iv., fig. 7), particularly in the former direction, than the outer. The whole antero-posterior width is also greater than that of the latter, (93 mm. to 73 mm). In lateral width the condyles are nearly equal. Held with the long axis perfectly vertical, the ectocondyle reaches a slightly lower level than its fellow. (Figs. 1, 2).*

When the two condyles are held at the same horizontal level their articular surfaces ascend in front to about the same level, but the upward extension of the inner, besides its greater prominence anteriorly, preserves a more uniform width than that of the outer, which latter becomes in its upper part reduced to a

* In Fig. 6, the axis is not quite vertical.

narrow tract (Fig. 6.) The superior contour line in front of the conjoined articular surfaces, though sufficiently distinct to form the inferior boundary of the supracondylar space, does not form a so marked a ridge as in *Dinornis*. Posteriorly, the corresponding contour line (not very distinctly marked and not distinguishable in Fig. 2) slopes downwards and inwards from the summit of the outer condylar region to that of the inner where it becomes continuous with the compressed and projecting postero-external ridge in which the inner condyle terminates behind.

When viewed from below the intercondylar channels, in front and behind, yield contours, the forms of which are seen in Pl. iv., fig. 7. The same figure shows the greater extent of the anterior production of the inner condyle, but it does not show very conspicuously another character which is to be noticed, viz., the greater lateral width of the whole trochlear surface in front than behind, the last-mentioned feature being due to the fact that, as the infero-internal border of the inner condyle sweeps backward it also inclines outwards, trending towards the corresponding border of the other side, the curve of which scarcely departs from a true antero-posterior plane. The degree of curvature of the inferior contour of the trochlear surface is shown in Figs. 1, 2, 6.

The greater part of the front of the inner surface of the ento-condyle is occupied by a large gibbous or nearly oval depression, of which the margin anteriorly and inferiorly comes right up to the edge of the articular surface. (Pl. iv., fig. 3, *Q*.) Behind the depression, about midway between the anterior and posterior border of the condyle, is an obtusely rounded, epicondylar, tuberosity (Fig. 3, *R*) which is not very prominent, and scarcely projects beyond the plane of the lower border of the condyle.

The external surface of the outer condyle (Fig. 4, *E C*) is nearly flat, or only very slightly concave, over its whole extent, and possesses no epicondylar tuberosity.

The supra-condylar extensor groove *(M)* may be discerned as commencing about six inches above the condyle on the outside of the ridge *(K)* described as leading downwards from the termination of the procnemial crest. The ridge is, in fact, continuous with the inner border of the groove. (Fig. 6, *KL*).

As the groove descends it deepens, and inclines outwards until it reaches the mid line, at which point it is spanned by the bridge (fig. 6, *S*). At this level the groove is deflected inwards at a somewhat abrupt angle, and below the bridge the groove is distinguishable as a broad, shallow canal, which emerges into the wide, but not deep, supra-condylar fossa. Of the borders of the groove, the inner *(L)* is the more prominent and rugose, and the outer *(M)* smooth. The bridge itself, median in position, and

placed very obliquely, stands prominently forward, especially in regard to its lower edge.*

The width of the bridge is 15 mm. at its outer end, from which point the breadth increases towards the inner side, the increase being due to the increasing obliquity of the upper border. Owing to the loss of a small piece which has been chipped out of the upper border near the inner pier the width at this end cannot be exactly stated, but would appear to have been 19 mm. The lower border of the bridge is considerably thicker than the upper, and somewhat everted. The lower outlet is oval, and its plane looks downwards and inwards, while the upper outlet forms a shorter, as well as narrower, oval than the lower.

In the canal covered by the bridge is a large pneumatic foramen which encroaches on the outer pier.

Close to the outer edge of the bone, and on a level with the outer pier, is a rough, obtusely conical tuberosity. (Fig. 6, *T*). In conformity with the more median position of the bridge, as compared with *Dinornis*, that tract of the lower expansion which lies internal to this structure, is much wider in *Genyornis* than in the New Zealand genus, and the continuation of this tract below the bridge, which forms the incline into the supra-condylar fossa, is in the former broad and somewhat transversely convex, in contrast to the condition in *Dinornis*, where it is pinched into more or less of a ridge. The distance from the middle of the lower border of the bridge to the nearest point of the internal condyle is 28 mm.

The dimensions of one of the large pair of tibio-tarsi are shown in Table II. Owing to the absence, or distortion, of parts of the upper end, it is impossible to state accurately the length in the great majority of specimens. That feature which is most perfectly preserved in nearly all of them is the lower end, and we therefore use the lateral width dimension of this for the purposes of comparison in point of size. We find that, among 24 tibio-tarsi in which perfection of the lower end permits accurate measurement to be stated, the width varies from four inches in the largest example to three and a quarter in the smallest. All but eight have a greater measurement than three and a half inches, and in none of the bones is there any evident sign of an immature condition.

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* The bridge is absent in both the large and nearly perfect pair of tibio-tarsi, and, in fact, from all but four of the specimens. The details respecting it are therefore taken from another specimen (that represented in fig. 6), comprising only the lower extremity and part of the shaft. In this the feature in question is perfect except for a small piece which has been chipped out of its upper border. *Vide* Trans. Roy. Soc. S.A., Vol. XX., p. 185.

TABLE II.

Showing dimensions of tibio-tarsus of *Genyornis newtoni* in comparison with those of the tibio-tarsi of *Dinornis elephantopus*, Owen (*Pachyornis elephantopus*, Lydekker), *and Æpyornis maximus.*

—	Length.		Breadth of proximal end.		Breadth of distal end.		Circumference of middle.	
	Inches.	Mm.	Inches.	Mm.	Inches.	Mm.	Inches.	Mm.
Genyornis newtoni...	$23\frac{3}{4}$	602	$7\frac{5}{8}$	193	4	101	$6\frac{3}{4}$	171
Dinornis elephantopus, Owen ...	24	608	$7\frac{5}{12}$	187	$4\frac{1}{6}$	105	$6\frac{5}{12}$	162
Æpyornis maximus, Geoffroy ...	$25\frac{1}{4}$	640	$7\frac{1}{2}$	190	$5\frac{5}{16}$	135	$6\frac{1}{4}$	158

The *Genyornis* tibia belongs to one of the large pair of femora of the preceding table. The measurements of that of *Dinornis elephantopus* are from Owen's tables and those of *Æpyornis* from Milne Edwards's work previously quoted, p. 93.

Fibula.—(Pl. iv., figs. 8, 9.) This bone presents the usual laterally sub-compressed and backwardly produced head. The superior articular surface—that upon which the femur plays—is an elongated oval, slightly concave antero-posteriorly, and nearly flat transversely. It is not coextensive with the whole upper surface of the head, but leaves a non-articular area in front which slopes more abruptly downward and forward. Lying obliquely athwart the internal surface of the head is an elongated depression or groove (Fig. 9, *A*) which is directed towards the edge of the articular surface of the tibio-tarsus, though the absence of a distinct corresponding facet on that bone has been mentioned. Externally the head is also slightly concave in antero-posterior direction.

The upper part of the shaft is sub-compressed in the same direction as the head, but soon becomes sub-circular in section. A little below the head on the anterior surface is a small tuberosity. With the commencement of the lower articular surface for the tibio-tarsus, about 5 inches below the summit, the shaft increases in size, becoming at the same time sub-triangular in section, the outer surface being convex, the postero-internal nearly flat, and the anterior somewhat concave.

The lower articular surface for the tibio-tarsus (Fig. 9, *B*) is an elongated rough area about three inches in length, which at its upper part is provided at the expense of the internal angle of the, in this situation, trilateral shaft, but as it descends it encroaches more and more upon that surface of the shaft de-

scribed as postero-internal till it comes to occupy nearly its whole width. A rough oval tuberosity (Figs. 8, 9, *C*) is developed upon the posterior border of the shaft a little below the level of the commencement of the articular surface, and below this there is a gradual reduction in the size of the shaft which, moreover, loses its trilateral character. Below the articular surface the shaft assumes the form of a cone, which in most of the specimens tapers rather abruptly to a blunt point. In the longest specimen the taper is more gradual, and the length below the articular surface, in this, is consequently greater.

The length of a large fibula, apparently complete as to its length, and of about the same size as an imperfect specimen belonging to one of the large tibio-tarsi, is $9\frac{7}{8}$ inches, while that of the smallest is $8\frac{1}{2}$ inches. The antero-posterior diameters of the heads of these two bones, measured obliquely in the direction of the longer axis, are $2\frac{7}{16}$ inches and 2 inches respectively. Seven fibulæ, only, were collected, but these are all in good preservation with the exception of the lower pointed extremity, which is broken off in most of them.

Tarso-metatarsus.—The ecto-condylar surface (Pl. v., fig. 3, *E C*) is subquadrangular and flat, with a slight slope downwards as it extends outwards. That of the ento-condyle (fig. 3, *I C*) somewhat exceeds a semicircle in shape; its transverse diameter is about equal to, and the antero-posterior diameter greater than, those measurements in the ecto-condyle. In the latter diameter it is slightly concave, and in the former greatly so, this character being principally due to the elevation of the inner margin into an elevated lip or crest (*A*), which rises a little higher than the anterior entocondylar process. This crest frequently exhibits a slight, externally directed curvature (fig. 1, *A*). The intercondylar tract, marked at about its centre by a shallow depression, rises in front into an obtusely angulated intercondylar process (fig. 1, *B*).

On the posterior aspect of the upper extremity there is a single thick, prominent and undivided hypotarsus (Pl. v., fig. 2, *C*) which rises above the articular surface as a sub-conical prominence, and reaches a somewhat greater elevation than the anterior intercondylar process. The inner surface of the hypotarsus is marked by a shallow groove which begins a little below its summit and curves somewhat forwards as it descends. This groove disappears under a broad but thin bridge of bone (fig. 2, *D*) which covers the opening of the posterior ent-interosseous canal, and below this it continues more or less distinctly for some distance down the postero-internal surface of the shaft.

The hypotarsus extends, mesially, down the shaft as a broa angular ridge with gradually diminishing elevation, which, how

ever, may be traced to within two inches of the posterior limits of the me-sotrochlea. As the ridge subsides a shallow groove commences on its inner side (fig. 2, *G*), which leads to the inner trochlear interspace.

On the front surface of the upper expansion there is a large interosseous depression, with declivous sides (Pl. v., fig. 1, *E*), the upper margin extending to within about an inch and a half of the summit of the anterior intercondyloid process. At the bottom of this pit are the anterior openings of the interosseous canals. Immediately below this depression, and encroaching upon its inferior slope, is a rough vertically striated surface for attachment of the tibialis anticus (fig. 1, *between E and F*). Immediately below this rough surface is the upwardly directed opening of a nutrient artery (fig. 1, *F*), to which a slight groove leads from below.

Above the large depression into which the interosseous canal opens anteriorly, the surface of the bone is transversely concave, and below it, also, the whole of the front surface of the shaft is occupied by a wide groove which becomes narrower and shallower as it descends; at a little below the middle of the shaft the groove has disappeared, and the front surface is flat transversely, below this, again, the same surface becomes more and more transversely convex with the increasing prominence of the meso-tarsus. An ill-defined shallow groove on the front surface of the lower third of the shaft, scarcely to be distinguished in the figure, leads to the outer intertrochlear interspace.

On the outer surface of the head there is a prominent, antero-posteriorly flattened keel-like process (Pl. v., figs. 1, 3 *H*) which commences a little below the outer margin of the articular surface, and extends downwards as a crest or ridge for from 2 to $2\frac{1}{2}$ inches. This crest and its ridge-like continuation forms the posterior boundary of a shallow groove upon the upper part of the outer surface of the ecto-metatarsus.

The outer side of the hypotarsus, is the large posterior opening of the ect-interosseous canal (Fig. 2., *J*). The opening of its fellow on the opposite side is, as has been stated, concealed by a bridge of bone. The upper-margin of the bridge is above, and the lower below, the level of the eclinterosseous canal.

Owing to the shape and prominence of the hypotarsus, the upper half of the tarso-metatarsus yields a trilateral, indeed almost an equilateral, section, the front surface however being reëntrant owing to its deep grooving. With the subsidence of the hypotarsal ridge, the trilateral section passes into an oval, of gradually increasing transverse diameter, as the shaft descends. In the middle third the postero-external surface is marked by an obscure vertical ridge.

There is no trace of the attachment of a hallux.

Of the three trochleæ (*L M K*) the median (*M*) is conspicuously the largest, the external (*K*) the next in size, and the internal (*L*) the smallest. The width proportions being, in a bone $13\frac{3}{4}$ inches long, 43 mm., 31 mm., and 14 mm. respectively. Their prominence anteriorly, and production inferiorly, are in the same order, though it is only the meso-trochlea which is produced, and that to a slight degree, beyond the plane of the anterior surface of the shaft. Posteriorly all three trochleæ are produced to about the same level and to the extent of little more than half an inch beyond the plane of the posterior surface of the shaft immediately above them.

The meso-trochlea is widest about the level of the tip of the ento-trochlea, the width, however, diminishing considerably from this point both as its surface extends upwards and backwards. The articular surface of this segment bears a well-marked vertical groove, plainly represented in figs. 1, 2, and 4, extending from its commencement to its termination ; its lateral surfaces, especially that on the outer side, are concave. Of the ecto-trochlea the anterior surface slopes backwards as it extends outwards, and bears a very slightly marked shallow groove, barely observable in the figures. Like the meso-trochlea, it diminishes in width from the commencement to the termination of its articular surface ; its inner surface is concave, and on its outer surface is a subcircular depression. The small ento-trochlea preserves nearly the same width throughout its contour ; its surface is convex transversely ; its outer aspect is somewhat concave, and on its inner is a small, shallow depression. Corresponding to the diminishing width, posteriorly, of the trochleæ themselves the trochlear interspaces are wider behind than in front, and that between the middle and outer segment reaches to a higher level than its fellow.

Just above the ecto-trochlear interspace are two foramina, situated vertically above one another ; the lower is separated from the summit of the interspace merely by a bar of bone,* while the other perforates the whole thickness of the lower expansion. The anterior orifices of both of these are shown in Pl. v., fig. 1, *N.* ; in fig. 2 the posterior orifice of the upper one only is visible (*N*). The shallow groove, described as existing on the lower part of the front surface of the shaft, leads towards the upper of these foramina. In one specimen, only, a similar foramen exists between the meso- and ento-tarsus just above the internal trochlear interspace at a level corresponding to that of the upper of the two perforations on the other side.

* In a good many specimens this bony bar which forms the lower boundary of the lower foramen has broken away.

Of the tarso-metatarsi collected twenty-one have been restored to a nearly perfect condition, and to nearly all of these almost complete sets of phalanges can be assigned.

TABLE III.

Showing comparative measurements of tarso-metatarsi of *Genyornis newtoni*, *Dinornis ingens*, Owen, *Dinornis gracilis*, Owen.

—	Length.		Circumference at middle.		Breadth (transverse) of distal end.		Breadth (transverse) at middle.		Antero-posterior breadth at middle.		Transverse breadth of proximal end.	
	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins	Mm.
Genyornis newtoni, No. 1; largest specimen	$14\frac{3}{4}$	374	$5\frac{1}{4}$	139	$3\frac{7}{8}$	98	$1\frac{7}{8}$	47	$1\frac{5}{8}$	41	4*	101
Genyornis newtoni, No. 2; medium specimen	$13\frac{3}{4}$	348	$5\frac{3}{8}$	137	$3\frac{1}{2}$	88	$1\frac{7}{8}$	47	$1\frac{1}{2}$	38	$3\frac{3}{4}$	95
Genyornis newtoni, No. 3; smallest specimen	$12\frac{5}{8}$	320	$4\frac{3}{4}$	120	$3\frac{1}{2}$	88	$1\frac{1}{2}$	38	$1\frac{5}{16}$	33	$3\frac{7}{8}$	98
Dinornis ingens, Owen	$13\frac{3}{4}$	348	$4\frac{1}{2}$	114	$4\frac{1}{2}$	114	$1\frac{7}{16}$	40	$1\frac{1}{4}$	32	$3\frac{1}{2}$	88
Dinornis gracilis, Owen	13	329	$4\frac{1}{4}$	107	$4\frac{1}{4}$	107	$1\frac{7}{12}$	40	$1\frac{1}{6}$	30	$3\frac{3}{8}$	84

* Measurement slightly reduced on account of abrasion.

The *Genyornis* tarso-metatarsus (No. 1) belongs to the large femur and tibio-tarsus of the preceding tables. The measurements of the *Dinornis* bones are from Owen's table.

Phalanges.—As recorded in the preliminary notes on this bird,* while the inner and middle toes possess the normal number of segments—three and four respectively—the outer possesses only four in place of the usual number of five. Of this fact there can be no doubt, as they were repeatedly counted in situ ; and, moreover, amongst the large number of sets of phalanges collected, there are none that would supply, or correspond to, the missing segment. In this connection it is interesting to note that Pro-

* Trans. Roy. Soc. of S.A., Vol. XX., p. 188.

fessor Hutton mentions *Euryapteryx gravis*, Haast (= *Dinornis gravis*, Owen = *Emeus gravipes*, Lydekker) and *Euryapteryx ponderosa*, Hutton, as, also, possessing only four phalanges in the outer toe. Trans. N.Z. Institute, Vol. XXVIII., 1895, p. 637.

The extreme length of the three proximal phalanges, in a set of bones belonging to a right tarso-metatarsus $14\frac{1}{2}$ inches long, which were selected for description both on account of their perfection and of the fact that all the bones almost certainly belong to one another, are II., 1, 83 mm., III., 1, 74, mm., IV., 1, 68 ; the length of the proximal phalanx of the inner toe is thus a characteristic feature of the foot. Besides its great relative length, Phalanx II., 1, is further characterised by its comparative slenderness and the lateral compression of the greater part of the shaft. (Pl. v., figs. 1, 2, *II.*) Its proximal articular surface forms a regular concave oval with the long axis vertical. (Fig. 5 *II.*) This elongated oval form of the articular surface determines the shape of the section of the proximal part of the shaft in which the lateral compression is most marked. From this distalwards, owing chiefly to the inclination of the superior border towards the inferior, the long vertical axis of the proximal part gradually diminishes until the section, just short of the distal articular expansion, becomes a figure that would be nearly circular but for some flattening of the inferior surface. The external surface is distinctly flatter than the internal, and on each side of the distal expansion is a shallow depression, that on the internal face being the smaller. The distal articulation forms a trochlear surface, of which the convexity, in a vertical direction, forms considerably more than a semicircle ; transversely, it is slightly concave in its upper part, and markedly so inferiorly.

Phalanx II., 2, has an almost quadrangular outline when viewed superiorly. The section of the proximal articulation is subtriangular, of which one angle is superior, and the base opposite somewhat convex inferiorly and produced further backwards than the angle above it. The upper surface is somewhat saddle-shaped, being slightly concave longitudinally, and convex transversely, while the under surface is slightly concave in both axes. The section, in the middle of the bone, thus forms a segment of a circle less than a semicircle. The distal articulation is somewhat crescentiform, of which the inferior margin, corresponding to the concavity, slopes backwards, and encroaches on the under surface of the bone. Small vascular canals exist on both superior and inferior surfaces.

Phalanx II., 3—the ungual phalanx—is a segment of variable length, but usually very short and depressed, slightly curved, and obtusely pointed, having on each side a more or less continuous vascular groove.

Phalanx III., 1, is distingnished by the height and breadth of its proximal, and the breadth and depression of its distal, end. The contour of the proximal articulation, of which the two principal diameters are nearly equal, is shown in Pl. v., fig. 5 *II.* Generally a low vertical elevation, present only in the inferior half, indicates a partial division into two facets, of which the inner is rather the larger. From the superior and inferior borders of this surface the upper and under surfaces of the shaft incline towards one another, the inclination being greater in the latter. In the middle of the bone the section is a transversely elongated oval, which becomes more flattened towards the distal end. On the under surface, a little in advance of the articular border, are two rough elevations which leave a shallow trough between them. The distal expansion is almost of the same lateral width as the proximal, but between the two ends the shaft is considerably narrower. The distal articular surface forms a trochlea, of which the convexity in a vertical direction exceeds a semicircle. A shallow median groove which extends in the same direction throughout its whole extent divides it into two convexities of about equal lateral width, though, in vertical depth, the inner considerably exceeds the outer. The lateral surfaces of the distal expansion are occupied by depressions, of which the inner is the larger.

Phalanx III., 2, approximates to a quadrangular contour when viewed from above, the length, however, being somewhat greater than the breadth. Its proximal articular surface is ovoidal, with the larger end internal. A very slightly marked vertical rising obscurely indicates a division into two facets, both of which are concave vertically. Of these, the inner facet is slightly the larger. The shaft is very greatly depressed, the lateral diameter, just posterior to the distal expansion, being to the vertical as 31 mm. to 9 mm. The distal expansion itself is also characterised by great breadth and small vertical height ; its articular surface, which extends further back below than above, forms a trochlea, the groove separating the two convexities being very broad and shallow, and the inner moiety slightly the deeper in a vertical direction. A shallow depression for the lateral ligament exists on the outer side of the distal expansion, but it is only feebly indicated on the inner. There may be one or more nutrient foramina on the under surface.

Phalanx III. 3 is considerably broader than long, in the proportion of 34 mm. to 18 mm., and much depressed. The proximal articulation is reniform with the convexity superior and, owing to a slight posterior production of the superior and inferior borders, particularly of the latter, this surface is concave vertically and mesially, but nearly flat on each side. The anterior

articular surface is sub-reniform, convex vertically, and slightly encroaches upon the inferior surface. The superior surface of the phalanx is rough and somewhat convex transversely, and the inferior is concave in both directions.

Phalanx III. 4. — This ungual phalanx, which forms an irregularly oval, concavo-convex plate, is broader than long, and does not greatly exceed in length that of its predecessor in the series. The plane of its proximal surface is inclined downwards and forwards, so that it encroaches on the under surface of the bone. The anterior border is broadly rounded. Two large vascular channels, the opening of one of which can be seen in fig. 6, enter just above each basal angle, and are directed forwards.

Phalanx IV. 1.—This segment has somewhat the same form as III. 1 on a smaller scale, the widths of the two bones at their middle points being as 21 mm. to 31 mm., and the lengths, as previously quoted, 68 mm. to 74 mm. Its proximal articular surface (Pl. vi., fig. 5, IV.) is concave and subtriangular with the base inferior. The external angle, at the base, being more prominent than the internal. From each of these angles a rough, rounded ridge is continued forward, on the under surface, for a short distance. The upper surface is convex transversely, the inferior nearly flat, and the section at its middle nearly semicircular. The distal expansion is depressed and has an articular surface of a form very like that of III. 1, except that the vertical depths of the two convexities of the trochlea are nearly equal. There is a depression on each of its lateral surfaces.

Phalanx IV., 2, is much depressed, with a contour and form resembling those of III., 2, only of considerably smaller dimensions.

Phalanx IV, 3, is similar in contour and form to III., 3, but much smaller.

Phalanx IV., 4, is a slightly curved, small ungual phalanx, a little longer than broad; rather larger and more obtusely pointed than II., 3. Just in front of the angles at the base are grooves which lead into vascular canals, which continue forwards in the substance of the bone. Smaller vascular perforations on both upper and under surfaces.

The segments of III. can be at once distinguished by the great breadth and depression of all but the proximal end of the first phalanx. Those of IV. have a general resemblance in form to the corresponding elements of III., but are only about two-thirds the width. The great relative length, slenderness and compression at once indicates II., 1. Ph. II., 2, has the general contour characters of IV., 2, but has only about two-thirds the breadth, and has not the same definite trochlea for its distal articulation

II., 3, is the smallest, and generally the most pointed of th ungual phalanges.

Considered collectively the characteristics of the toes are the depression of the phalanges and of the articulations, with the exception of those with the tarso-metarsus ; the length, slenderness and compression of the proximal phalanx of the inner toe ; the inconsiderable degree of concavity of the proximal articulation surfaces, due in great part to the absence of that production posteriorly of the central part of the superior and inferior borders which exists to a marked degree in the phalanges of the emeu, and to a less, though still to a considerable, degree in *Dinornis*, and which, when present, must contribute materially to the strength of the joints. So also the absence of deep vertical grooving of the distal trochleæ and the shortness, depression and feebleness of the ungual phalanges of *Genyornis* are additional characters which indicate weakness of the toes and a want of security in their joints.

EXPLANATION OF PLATE III.

Genyornis newtoni :—Femur (left) ; figs. 1-4.

Fig. 1. Anterior surface.
2. Posterior surface.
3. End contour of proximal extremity.
4. End contour of distal extremity.

In figs. 3 and 4 the upper margin corresponds to the posterior surface.

Index to Letter References.

A	Depression for round ligament.
B	Trochanter.
C	Trochanteric articular surface.
D	Pre-trochanteric surface.
E	Ecto-trochanteric surface.
EC	Ecto-condyle.
ET	Ecto-trochanteric tuberosity.
F	Intermuscular ridge
G.G	Depressed areas.
H	Pneumatic foramen.
IC	Ento-condyle.
J	Popliteal fossa.
K	Posterior intercondylar notch.
L	Fibular groove.
M	Posterior border of ento-condyle.
N	Anterior intercondylar ridge.
O	Posterior intercondylar ridge.
P	Ecto-condylar fossa.
RC	Rotular channel.

All the figures are half size.

EXPLANATION OF PLATE IV.

Genyornis newtoni :—Tibio-tarsus (right) ; figs. 1-7.

Fig. 1. Anterior surface.
2. Posterior surface.
3. Internal surface.
4. External surface.
5. End contour of proximal extremity.

Figs. 1-5 represent one of the largest pair in the collection (No. I. of table I.)

6. Anterior surface of lower end of another and rather smaller specimen in which the extensor bridge has been well preserved.
7. End contour of distal extremity. The upper margin corresponds to the anterior surface.

Index to Letter References.

A Intercondylar eminence.
B Rotular or cnemial channel.
C Cnemial process.
D Inner border of cnemial process.
E Epi-cnemial crest.
EC Ecto-condyle (of both upper and lower ends).
F Pro-cnemial crest.
G Ecto-cnemial crest.
H Lateral process of ecto-cnemial crest.
IC Ento-condyle (of both upper and lower ends).
J Ecto-cnemial cavity.
K Continuation of pro-cnemial crest.
L Inner border of extensor groove.
M Outer border of extensor groove.
O Articular surface for fibula.
P Tuberosity.
Q Ent-epicondylar depression.
R Ent-epicondylar tuberosity.

Fibula (left) ; figs. 8 and 9.

Fig. 8. External surface.
9. Internal surface.

Index to Letter References.

A Depression on inside of head (upper articular surface).
B Lower articular surface.
C Tuberosity.

All the figures are half size.

EXPLANATION OF PLATE V.

Genyornis newtoni :—Tarso-metatarsus and Toes (right) ; figs. 1-6.

Fig. 1. Anterior surface of tarso-metatarsus with upper surfaces of phalanges.
2. Posterior surface of tarso-metatarsus with lower surfaces of phalanges.

FIG. 1 - $\frac{1}{2}$

FIG. 2 - $\frac{1}{2}$

FIG. 3 - $\frac{1}{2}$

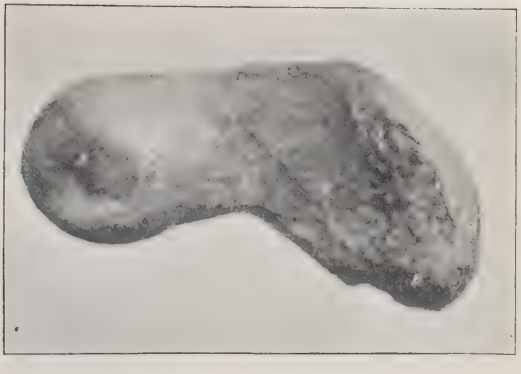


FIG. 4 - $\frac{1}{2}$

ERNEST GALL PHOTO-TYPE
ALMA CHAMBERS ADELAIDE

Fig. 1.

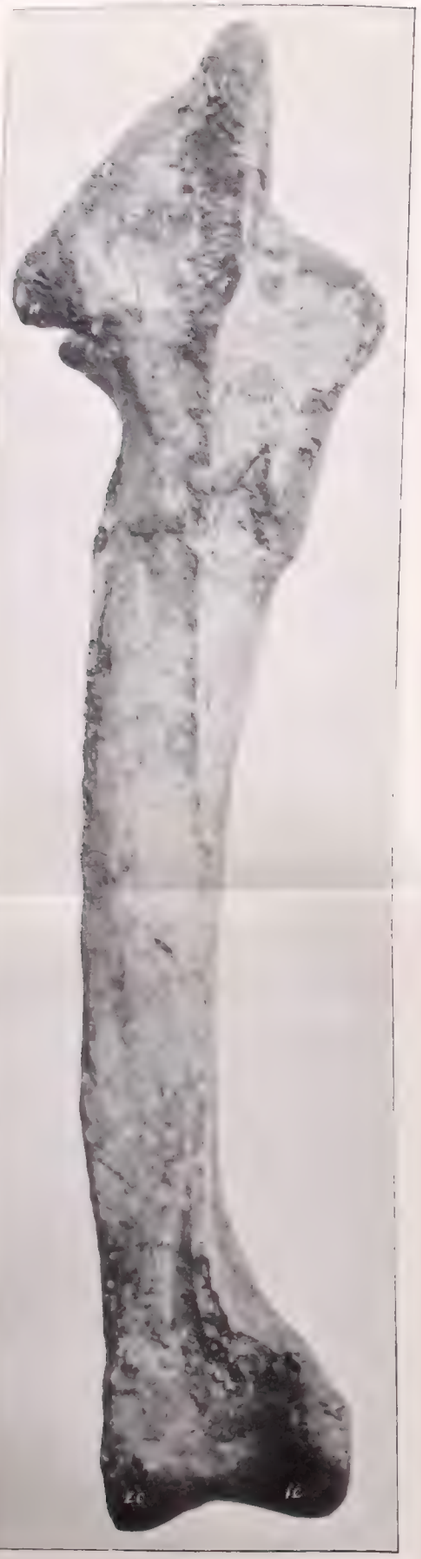


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6. $\frac{1}{2}$

Fig. 7.

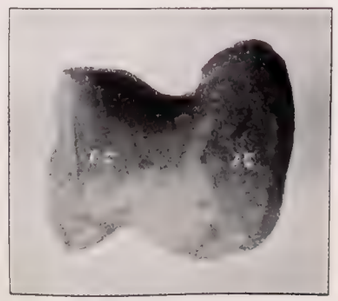


Fig. 8. $\frac{1}{2}$

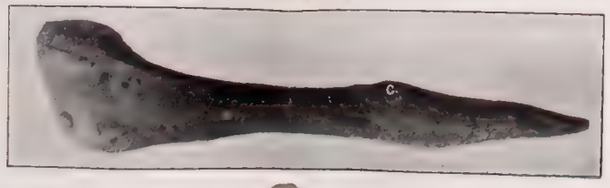
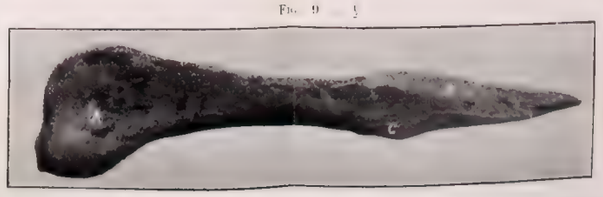
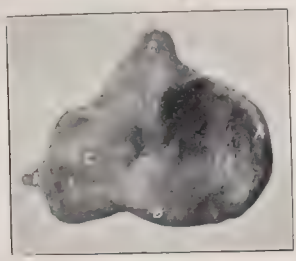
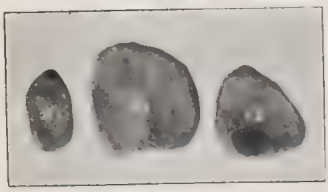


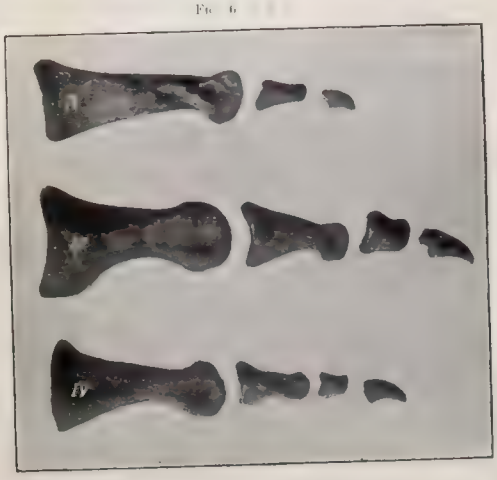
Fig. 9. $\frac{1}{2}$



A
E







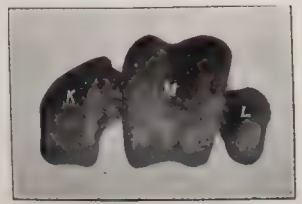

K
M
L

Fig. 3. End contour of proximal extremity of tarso-metatarsus. The upper margin corresponds to the posterior surface.
4. End contour of distal extremity of tarso-metatarsus. The upper margin corresponds to the anterior surface.
5. Contours of proximal ends of proximal phalanges. The upper margin corresponds to the dorsal surfaces.
6. Outer surfaces of phalanges.

INDEX TO LETTER REFERENCES.

A Elevated lip of ento-condyle.
B Anterior intercondylar process.
C Hypotarsus.
D Bridge covering posterior ent-interosseous canal.
E Anterior interosseous depression.
EC Ecto-condylar surface
F Nutrient arterial foramen.
G Groove on posterior surface leading to inner intertrochlear interspace.
H Keel like process on outer side of upper extremity.
IC Ento-condylar surface.
J Posterior ect-interosseous canal.
K Ecto-trochlea.
L Ento-trochlea.
M Meso-trochlea.
N Foramina above ecto-trochlear interspace.
II. Proximal phalanx of inner toe.
III. Proximal phalanx of middle toe.
IV. Proximal phalanx of outer toe.

The other phalanges of each toe are placed in their proper relative order.

All the figures are half size.

The Coleoptera of Lake Callabonna.

By J. G. O. Tepper, F.L.S., &c.

[Read October 6, 1896.]

The following list represents the Coleoptera collected by A. Zietz, Esq., F.L.S., in the vicinity of the above lake (formerly known as Lake Mulligan) during the latter part of 1893. They were placed in the hands of the Rev. Thomas Blackburn, who kindly identified them for the South Australian Museum, and has described the numerous new species in the Transactions of the Royal Society, S.A., without enumerating those already known.

I. Cicindelidæ.

1. Megacephala Howitti, *Cast.*
   cylindrica, *McLeay.*

II. Carabidæ.

2. Calosoma Schayeri, *Erichs.*
2*a*. Diaphorus (Zuphiosoma) fulva, *Cast.*
3. Gigadema longipennis, *Germ.*
   sulcata, *McLeay.*
4. Trigonothops nigrosignata, *Chaud.*
5. Phlæocarabus crudelis, *Newm.*
6. Neocarenum Blackburni, *Sloane.*
7. Philoscaphus Tepperi, *Blackb.*
8. Euryscaphus obesus, *McLeay.*
9. Geoscaptus lævissimus, *Chaud.*
10. Chlænius australis, *Dej.*
    lateriviridis, *Chaud.*
    Poecilus? sp.
11. Oodes Waterhousei, *Cast.* (*interioris*, *Cast.*).
12. Phorticosomus grandis, *Cast.*
13. Anisodactylus rotundicollis, *Cast.*
14. Hypharpax habitans, *Sloane.*
    interioris, *Sloane.*
    vilis, *Blackburn.*
15. Rhytisternus Arnheimensis, *Cast.* (?).
    Callabonnensis, *Blackb.*
    cyathoderes, *Chaud.*
    Froggatti, *McLeay.*
    Stuarti, *Sloane.*
16. Chlænioidius herbacea, *Chaud.*

17. Dicrochile Goryi, *Boisd.*
18. Anchomenes marginicollis, *McLeay.*
19. Pogonus cardiotrachelus, *Chaud.*
    hypharpioides, *Sloane.*
    Zietzi, *Sloane.*
20. Bembidium Jacksoniense, *Guér.*

III. Dytiscidæ.

21. Edroma benefica, *Newm.*
22. Bidessus bistrigatus, *Clark.*
23. Necterosoma penicillata, *Clark.*
24. Platynectes decempunctata, *Fabr.*
25. Rhantus pulverulentus, *Steph.*
26. Eretes australis, *Erichs.*

IV. Hydrophilidæ.

27. Hydrophilus albipes, *Cast.*
28. Hydrobius assimilis, *Hope.*
29. Phylhydrus Andersoni, *Blackb.*
30. Hygrotrophus nutans, *McLeay.*
31. Berosus Macumbensis, *Blackb.*
    minutipennis, *Blackb.*
32. Notoberosus Zietzi, *Blackb.*

V. Staphilinidæ.

33. Aleochara semirubra, *Fauvel.*
34. Quedius semiviolaceus, *Fauvel.*
35. Creophilus erythrocephalus, *Fabr.*
36. Scimbalium duplopunctatus, *Fauvel.*
    microcephalum, *Fauvel.*
37. Dicax deserti, *Blackb.*
38. Pæderus cruenticollis, *Germ.*
39. Pinophilus latebricosus, *Blackb.*
    trapezus, *Fauvel.*

VI. Paussidæ.

40. Arthropterus *(?)* sp.

VII. Histeridæ.

41. Saprinus lætus, *Erichs.*
    cyaneus, *Fabr.*
    sp.

VIII. Colydidæ.

42. Bothrideres variabilis, *Blackb.*

IX. Dermestidæ.

43. Dermestes cadaverinus, *Fabr.*
    vulpinus, *Fabr.*

X. Scarabæidæ.

44. Aphodius Callabonnennis, *Blackb.*
lividus, *Oliv.*
sp. (?)
45. Ataenius Zietzi, *Blackb.*
46. Onthophagus consentaneus, *Har.*
Murchisoni, *Blackb.*
nitidior, *Blackb.*
47. Bolboceras trituberculatum, *Bainb.*
48. Trox Augustæ, *Blackb.*
Crotchi, *Har.*
litigiosus, *Har.*
quadridens, *Blackb.*
Strzelecki, *Blackb.*
49. Liparochrus geminatus, *Westw.*
sp.
50. Liparetrus Adelaidæ, *Blackb.*
aridus, *Blackb.*
distinctus, *Blackb.*
melanocephalus, *Blackb.*
51. Colpochila deceptor, *Blackb.*
palpalis, *Blackb.*
52. Heteronyx addendus, *Blackb.*
arcanus, *Blackb.*
decorus, *Blackb.*
horridus, *Blackb.*
Helmsi, *Blackb.*
sparsus, *Blackb.*
suturalis, *Blackb.*
vagans, *Blackb.*
sp.
53. Rhopæa Mulliganensis, *Blackb.*
54. Zietzia geologa, *Blackb.*
55. Callabonnica propria, *Blackb.*
56. Isodon pecuarius, *Reiche.*
sp.
57. Semanopterus rectangulus, *Blackb.*

XI. Buprestidæ.

58. Bubastes splendens, *Blackb.*
59. Chrysobothris interioris, *Blackb.*
60. Merimna atrata, *Cast. et Gory.* ("Fire Beetle.")

XII. Elateridæ.

61. Dromæolus interioris, *Blackb.*
62. Agrypnus Mastersi, *McLeay.*

63. Lacon fatuus, *Cand.* (?).
guttatus, *Cand.*
variabilis, *Cand. (et var.)*
Zietzi, *Blackb.*
64. Tetralobus Fortnumi, *Hope.*
65. Monocrepidius commodus, *Blackb.*
inamœnus, *Blackb.*
66. Cardiophorus elisus, *Cand.* (?)

XIII. Malacodermidæ.

67. Metriorrhynchus brevirostre, *Waterh.*

XIV. Cleridæ.

68. Laius bellulus, *Guér.*
pretiosus, *Blackb.*
69. Opilo congruus, *Newm.*
70. Orthrius cylindricus, *Gorh.*
71. Eleale aulicodes, *Gorh.*
sp.
72. Necrobia rufipes, *Degeer.*
73. Dasytes fuscipennis, *Hope.*

XV. Ptinidæ.

74. Polyplocotes sp.

XVI. Bostrychidæ.

75. Xylopertha sp.

XVII. Tenebrionidæ.

76. Opatrum Cowardense, *Blackb.*
torridum, *Champ.*
77. Cestrinus Zietzi, *Blackb.*
78. Pterohelaeus alternatus, *Pascoe.*
bullatus, *Pasc.*
fraternus, *Blackb.*
79. Helaeus interioris, *McLeay.*
squamosus, *Pascoe.*
80. Hypocilibe læta, *Blackb.*
81. Brises trachynotoides, *Pascoe.*
82. Ephidonius parvicollis, *Blackb.*
83. Tenebrio molitor, *L.*
84. Chalcopterus carus, *Blackb.*
85. Homotrysis Callabonnensis, *Blackb.*
86. Ulomodes humeralis, *Blackb.*

XVIII. Cistelidæ.

87. Apellatus palpalis, *McLeay.*
88. Scaletomerus harpaloides, *Blackb.*

XIX. Mordellidæ.

89. Mordella communis, *Waterh.*

XX. Oedemeridæ.

90. Ananca Zietzi, *Blackb.*

XXI. Curculionidæ.

91. Prosaulius comosus, *Germ.*
92. Pephricus squalidus, *Germ.*
93. Hyphæria paralella, *Blackb.*
94. Sclerorrhinus sp.
95. Cubicorrhynchus taurus, *Blackb.*
96. Ophriota rapax, *Blackb.*
97. Oxyops fasciatus, *Boisd.*
98. Desiantha sericea, *Blackb.*
99. Isacantha (?) sp.
100. Catocalephe minans, *Blackb.*

XXII. Cerambycidæ.

101. Phoracantha semipunctata, *Fahr.*
102. Neostenus spinipennis, *Blackb.*
103. Aposites lanaticollis, *Blackb.*
104. Anatisis *(Petalodes)* laminosus, *Newm.*
105. ? Genus nov., sp. n. (?).

XXIII. Chrysomelidæ.

106. Chalcolampra acervata, *Germ.*
107. Paropsis Zietzi, *Blackb.*
108. Aulacophora hilaris, *Boisd.*

XXIV. Coccinellidæ.

109. Coccinella repanda, *Thunb.*

Various single undeterminable specimens.

24 Families, 111 genera, 160 species (12 not named).

Descriptions of New Species of Marine Mollusca of South Australia.

By Jos. C. Verco, M.D., Lond., &c.

[Read October 6, 1896.]

Plates VI. — VIII.

Voluta translucida, *spec. nov.* Pl. vi., figs. 4 and 4a.

Shell elongately ovate, very thin, diaphanous smooth and glistening, of six whorls including the nucleus. This is inconspicuous, merging imperceptibly into the spire-whorls, apparently consisting of one turn and a half, very flatly convex at the apex, smooth. Spire-whorls sloping, slightly convex, suture simple, surface smooth, but for very obsolete incremental striæ. Body-whorl relatively large, smooth but for obsolete longitudinal striæ, which become more conspicuous toward the aperture, especially anteriorly and over the scarcely raised varix of the notch. Aperture elongate-ovate, narrowed posteriorly, dilated anteriorly, and with a very wide shallow notch. Outer lip simple acute thin convex when viewed either laterally or from below. Columella convex in the posterior half, almost straight anteriorly; no callus of the inner lip ; fourplicate, the lower three plicæ well-marked narrow and equi-distant, the uppermost less raised and at a less distance.

Ornament, a narrow spiral reddish-brown line close beneath the suture ; longitudinal narrow curved lines of the same color, about 16 in the body-whorl, composed of minute zigzags or of very small spirally elongated spots ; two indefinite spiral color-bands encircle the whorl, one at the level of the posterior angle of the aperture, another just above the level of the highest columellar plait winding over the dorsum of the notch, composed of prolongations of the zigzags between the longitudinal lines, and thickening of the spots in the lines

Total length, 39·5 mm.; greatest width, 16 mm.; spire, 14·5. Length of aperture, 25 mm.; width, 7 mm.

Habitat.—One perfect dead specimen 20 fathoms off Newland Head, outside Backstairs Passage ; broken fragments of two in six to ten fathoms Yatala Shoal, and six small immature dead specimens from dredge siftings 22 fathoms Backstairs Passage *(Verco).*

Harpa punctata, *spec. nov.* Pl. vi., figs. 3, 3a, 3b.

Shell roundly-ovate, rather thin, smooth, glistening, of four and a-half whorls. Nucleus one turn and a-half, slightly mammillate, apex inserted, first whorl rather excentric, next half-whorl marked off from the first by a depressed scar; suture simple and distinct; distinguished from spire-whorls by its smoothness, but for minute sublenticular longitudinal striæ, and by absence of ornament. Spire-whorls two, gradated, with a marked very slightly rounded angle, behind which the first turn is subconvex, becoming gradually less so, the second is subconcave, and in front of which both are slopingly subconcave; very minutely longitudinally striated under the lens, best seen behind the angle, and still more minutely spirally incised. On the second spire-whorl are also erect reflected curved scales, at gradually increasing intervals, best seen behind the angle, and continuous anteriorly with slightly prominent subvaricose longitudinal striæ. Body-whorl ventricose, slightly excavated close to the suture, forming a slightly rounded angle, then uniformly sloping-convex; surface divided into ten longitudinal areas by the remains of slightly projecting lips, which behind the angle form erect, rounded, slightly-reflected plates, the earlier ones more and more worn away; the areas finely longitudinally and spirally incisedly striate. Aperture large, nearly plano-convex; outer lip uniformly convex, simple, very slightly thickened outside, rather more so about two lines within, edge almost sharp; posteriorly ascending for two lines, slightly reflected and pointed, and forming a marked notch at the suture. Columella slightly convex behind, nearly straight in the anterior half, excavated in the lower fifth. Inner lip distinct, smooth, with callus increasing in thickness from behind forward; posteriorly it forms a short sinus with the ascending outer lip, then is applied spreading somewhat and uniformly over the body-whorl; in the lower half with a free margin least marked where it crosses the varix of the notch, then slightly inflected and incurved to the extremity of the columella. Anterior notch distinct and everted and recurved.

Ornament, nucleus, and spire-whorls of a uniform salmon tint. The latter and the body-whorl closely dotted with small deep chestnut spots, their spiral diameter twice as great as their longitudinal, arranged in longitudinal series so that the dot of each is opposite the space in the next. The body-whorl has also two broad salmon-coloured spiral bands, one from the back of the aperture to a little above the middle of the lip, the other from a little above the middle of the aperture to the lower third of the lip. Just behind the remains of previous lips in these bands are crescents of dark chestnut, and similar crescents are found here and there on the body and spire-whorls close to the suture.

Behind these bands is one narrower and less distinct, and another at and behind the angle ; one between the broad bands, and two in front of the lower one. Between all the bands are narrow indistinct whitish areas. The inner edge of the lip is white, with less distinct and narrower coloured areas corresponding with the bands outside. The throat is translucent, and reveals faintly the external dots and bands.

Habitat.—Two recent and two broken shells, 20 fathoms Newland Head ; one immature dead and one broken, 22 fathoms Backstairs Passage *(Verco).*

This new species cannot be confounded with any other form. The distant ribs and dotted ornament distinguish it at once.

Tryon says, in his Man. of Conch., Vol. V., p. 97, "Like *Strombus*, *Harpa* appears to be a completed genus, no new forms rewarding the industry of modern investigators and explorers." The discovery of a new species is, therefore, of peculiar interest. And this is increased by the fact that the two other Australian forms, *H. ventricosa*, Lam., and *H. minor*, Lam., are inhabitants of the warmer regions of the North and North-West parts of the continent.

Tritonidea (Cantharulus, Meek, 1876) **fusiformis,** *spec. nov.*
Pl. vi., figs. 1, 1a, 1b ; var., 2, 2a.

Shell ovately fusiform, solid, whorls seven, including the nucleus. Nucleus conspicuous, of two turns, smooth, convex ; suture deep, apex slightly exserted (in specimens as usually found on the beach it is inconspicuous, and nearly flat.) Spire-whorls four, convex, sutures regular distinct, impressed ; longitudinal costæ regular round, width rather greater than the intervals or the height. Thirteen in the penultimate whorl, crossed by spiral liræ, rounded, valid, not quite so wide as the interstices, nine primary in the penultimate, with two or three secondary threadlets in the wider spaces ; very numerous fine longitudinal sublenticular incised striæ. Body-whorl uniformly convex, contracted anteriorly ; 11 to 12 longitudinal costæ, most marked posteriorly, becoming less valid in front of the periphery. About 30 spiral liræ, fairly regular, with an occasional interstitial threadlet crossed by minute incremental incised striæ. Aperture elongately oval, somewhat narrowed anteriorly. Outer lip uniformly convex, margin sharp, minutely crenulated throughout, outside varicosely thickened from suture to notch by a rounded pad with a corresponding furrow inside of varying depth in different specimens ; internally otherwise smooth, save for an obsolete blunt tooth-like process close to the suture ; in some individuals there are seven or eight narrow plicate denticles nearly equidistant. Columella concavely arcuate above, straight

and slightly sinistrally oblique below, the junction marked by a scarcely bifid spiral callus plica. Inner lip with a thin smooth shining callus applied posteriorly, margined in the lower third, in some individuals with a margin just free throughout; a spiral tooth-like blunt process close to the suture forms with a corresponding one on the outer lip a kind of sinus. Canal short, rather wide, outer lip just everted; scarcely recurved, notched anteriorly. Ornament faint rusty-brown with narrow white band above the sutures, and encircling the body-whorl just above the middle; bounded above by a line one-third of its width, of darker colour, generally most marked on the costæ so as to appear somewhat articulated; a similar but less marked line bounds it below; irregular rust-coloured longitudinal flames extend from the white bands to the anterior extremity of the body-whorl; interior of aperture of a rusty-purplish colour with an indistinct broad whitish spiral band. In life a thin minutely hairy periostracum covers all the shell except the nucleus, and almost hides the ornament.

Total length, 17 mm.; greatest width, 8·5 mm.; length of spire, 8 mm.; body-whorl, 9 mm.

Habitat.—Dreged alive 15 fathoms Investigators Straits, one; off Middleton, 15 fathoms, one recent; 20 fathoms in and outside Backstairs Passage, one recent and one dead *(Verco)*, Spencer Gulf.

Variety, *T. Adcocki.* Rather more solid, with about 11 spiral liræ in the body-whorl, which become progressively stouter and more distant anteriorly with one or two interstitial threadlets, and where the liræ are stoutest with secondary threadlets on their sides. The longitudinal costæ are rather narrower and higher and quite pronounced posteriorly, but below the periphery they are almost broken up into very large tubercles on the spiral liræ. The aperture is generally more contracted, there are seven well-marked teeth inside the outer lip, besides the posterior process. On the inner lip the columellar projection anteriorly is validly bifid, and at the margin of the lip there are four rather distant teeth in a series diminishing backwards, besides the well-marked posterior tubercle. The white band with its dark margins is less conspicuous, the longitudinal rusty waved flames are rather more marked, though somewhat broken up into dots or blotches chiefly on the nodular intersections of costæ and liræ. Intermediate forms connect this variety with the typical species.

Habitat.—Middleton Beach *(D. J. Adcock)*.

Diagnosis.—Hitherto, in South Australia, it has been called *Cantharus rubiginosus*, Rve., but is quite distinct from that. Its nearest ally appears to be *Buccinun D'Orbignyi*, Payrandeau,

Cat. Moll. de Corse, p. 159, pl. 8, f. 4 to 6; also Conch. Icon. Rve. Bucc., f. 44; Man. of Conch. Tryon, Cantharus, vol. III., p. 158, pl. 73, f. 266. Variety *C. Adcocki* approaches this; but from the description, which is meagre, and from the plate, one would judge that the costæ of the foreign shell are less numerous and more valid, the canal is less oblique, while the ornament, beautifully variegated with black and yellow, is different.

Triton (Argobuccinum) mimeticus, *Tate (Sipho).*
Pl. vi., figs. 6, 6a, 6b.

This shell was referred to by me in a previous paper as *Triton mimeticus*, Tate, and I place it now in the subgenus *Argobuccinum*. I obtained a living specimen in 20 fathoms off Newland Head, and a recent dead one in 17 fathoms off Porpoise Head, both places just outside Backstairs Passage, as well as a dead specimen, and fragments of two more. The first two have each three varices, and of these the first lies close behind the third. The canal figured in Proc. Roy. Soc., S.A., 1895, vol. XIX., pl. ii., f. 4, 4a, was fractured. In a living shell 25 mm. in length, with an aperture of 8·5 mm. long, the canal is 8·75 mm. in length. Nearly closed at first, it gradually becomes about twice as widely open at the anterior as at the posterior end; the whole canal is slightly uniformly recurved. There is no periostracum. Above the row of tubercles the shell is fulvus brown, with deeper-tinted blotches; the tubercles are white. Below these it is fulvous-brown, except for a spiral white band about two lines in width, bounded above and below by a fine line articulated white and brown, the joints being rather long, the lower one on the obsolete carina. A third articulated line is at an equal distance in front. The anterior extremity of the canal becomes gradually deep brown. On the outside of the outer lip are four equidistant, rather large squarish brown spots. Operculum large, filling the aperture, ovate, nucleus apical. The dentition (Pl. vi., fig. 6b) shows a central rachidian tooth five-cusped, an inner uncinus or lateral six or seven pointed, and two simple uncini, the inner sickle-shaped, the outer scimitar-shaped. The disposition of the varices is that of *Ranella* and *Argobuccinum*, and the peculiar flat shape of the shell brings it into alliance with these. The simplicity of the uncini, their freedom from saw-points, suggests relation with *Ranella* rather than *Triton*. But the length of the anterior canal compared with that of the aperture, which it fully equals, is found in *Triton*, but is an unknown character in *Ranella*. The only Ranelliform shell in which the canal approaches the aperture in length is *Argobuccinum gigantea*, Lam., and no *Ranella* is known to me in which, as in this, the canal equals one-third of the total length of the shell. The apical nucleus of the

operculum, and the absence of a posterior canal, locate it in *Argobuccinum* as a subgenus of *Triton*, with affinities to *Ranella*.

Drillia telescopialis, *spec. nov.* Pl. vii., figs. 1, 1a, 1b.

Shell minute, thin. Whorls six, including the nucleus. Nucleus one turn and a half, smooth, with deep impressed suture, apex exserted. Spire-whorls sloping, nearly straight, gradated, angled at junction of posterior and middle fourth ; behind this the whorl is bevelled to the suture, which is distinct and impressed. Whorls sculptured with spiral liræ, four to six in front of the angle, two behind it, flatly rounded, equidistant, wider than the interspaces. Longitudinal liræ numerous, equidistant, about 20 in the penultimate whorl, narrower than the interspaces ; in some specimens crossing the spiral liræ and wider than them, generally most marked and forming conspicuous costæ in the second and third spire-whorls ; in others narrower, crossed by the spiral liræ, giving a cancellated appearance. Body-whorl nearly cylindrical, angled a little below the suture and again at the periphery, below which it is excavately contracted to the base ; provided with spiral liræ, two behind the upper angle, about seven between the angles, and nine or ten below, the most valid forming a minute carina at the lower angle, crossing or crossed by 18 to 20 wider or narrower longitudinal liræ continued to the base, though less conspicuous here. Aperture elongately rhomboidal ; wider anteriorly. Outer lip simple, thin, crenulated, with a well-marked semi-circular sinus from the posterior angulation to the suture, lip slanting obliquely from the carina to the anterior notch. Columella straight, inner lip inconspicuous except behind, where there is a columellar callus, from which springs the acute upper boundary of the sinus. Notch simple, anterior extremity truncated obliquely to the left. Ornament uniform, rusty-brown or white.

Length, 45 mm.; breadth, 1·25 mm.

Habitat.—Backstairs Passage, 14 dead.

Types in my cabinet.

Diagnosis.—I know no *Drillia* with an approximate form.

Drillia pentagonalis, *spec. nov.* Pl. vii., figs. 2, 2a.

Shell minute, telescope-shaped, rather thick. Whorls four and a half, without the nucleus. Nucleus absent. Spire gradated, whorls straight-sided in the anterior three-fourths, and bevelled at an angle of 45° to the posterior suture, which is distinct and simple. Five longitudinal ribs, continuous, narrow, erect, prominent ; interspaces nearly flat, giving a pentagonal section. Sublenticular inconspicuous longitudinal and spiral striæ, which cross the ribs. Body-whorl with five longitudinal ribs, squarely rhomboidal, angulated near the suture, and carinated at the

periphery, the ribs having projecting points here, and the carina being curved between them; whorl excavately contracted below. Scarcely visible sublenticular longitudinal striæ in upper part; rather less obsolete spiral striæ; these are more valid below the carina, where seven can be counted on the ventral aspect. Aperture narrow, elongately oblong. Outer lip varicosely thickened by a rib, margin thin, simple, and sharp, straight for four-sevenths of its length, between the angle and the carina, curved towards the notch in the lower two-sevenths, and containing a well marked sinus in the upper seventh, rather more than a semi-circle, not quite reaching to the suture. Columella straight, slightly concave below, inner lip inconspicuous. Ornament unicoloured dull stony-white.

Length, 3·5 mm.; breadth, 1·25 mm.

Habitat.—Dredge siftings (probably Backstairs Passage), deep water, two dead *(Verco)*.

Diagnosis.—From *D. telescopialis*, nobis, by the pentagonal shape, the five ribs, and the absence of cancellation.

Mitra Vincentiana, *spec. nov.* Pl. viii., fig. 3.

Shell, elongately-fusiform, moderately solid. Nucleus detached in all specimens, and earlier whorls corroded. Spire, eight whorls, slightly convex; suture well marked, linear, minutely channelled. First three or four whorls longitudinally costate, costæ gradually becoming obsolete, but may sometimes be traced to the next whorl, and may be represented by indistinct and irregular plicæ over the rest of the spire; spiral threadlets rounded and indistinct, about 12 in the penultimate whorl; very minute sublenticular incremental longitudinal striæ are also visible.

Body-whorl uniformly very slightly convex; faintly marked close-set longitudinal striæ, and numerous low, unequal rounded spiral threadlets, least marked over its centre. A very distinct spiral furrow starts just above the highest columallar plica, and winds round the dorsum of the base with two or three shallower ones behind it, and about four or five wrinkles in front of it. Aperture oblique, narrow, elongate-oval, contracted above, opening widely into the notch below. Outer lip uniformly curved, except for slight central straightening, simple, thin, sharp, smooth internally. Columella straight, very slightly excavated anteriorly; plicæ four, well marked, intervals regularly narrowing anteriorly; sometimes the elevated anterior margin of the columella exactly simulates a small fifth plica. Inner lip scarcely visible, except below the lowest plica, whence the callus stretches to the notch; only in living specimens can the extent of the lip be recognised, and then only by the polished surface of the aper-

ture. Notch well marked, margins slightly everted. Ornament, uniform dull salmon colour.

Length, 19 mm.; breadth, 6·75 mm.; aperture length, 8·5 mm.; width, 2·75.

Diagnosis.—It differs from *M. Rosettæ*, Ang., in the costation of the earlier whorls, and in the absence of the punctated spiral incisions. It differs from *M. Australis*, Swns., in its more attenuated form, in the less abrupt contraction of the body-whorl below the periphery, the more uniform curve with a larger radius of the outer lip, and the consequent absence of the contraction of the lower part of the aperture; also in the relative length of the aperture and spire; in *M. Australis*, in the smaller shells, these are as 100 to 103·6, in the larger as 100 to 114·3, in *M. Vincentiana* as 100 to 131·4.

Habitat.—Investigators Straits from 13 to 15 fathoms, two recent; off Bank's Islands, Spencer Gulf, in 10 fathoms, one recent; Backstairs Passage, in 17 fathoms, one dead *(Verco)*.

Types in my cabinet.

Surcula Perksi, *spec. nov.* Pl. vii., figs. 3, 3a, 3b, 3c.

Shell fusiformly ovate, solid, imperforate. Whorls ten, including nucleus. Nucleus two whorls, smooth, inflated, horn-colored. Spire, suture distinct, impressed, finely crenulated; whorls subconvex, with a groove at the junction of the upper and middle third, having a double row of granules just above it, and another row immediately below it. Numerous longitudinal wavy plicæ, about as wide as the intervals, and not quite so high, rounded, about 25 in the penultimate whorl. Abundant fine spiral striæ, 15 in the penultimate, crossing the plicæ, and making them granose. Body-whorl subinflated, contracted at the base, sculpture in the upper part as in the spire; longitudinal granose plicæ, about 40, following the sinuosities of the outer lip, lost at the extreme base, and becoming less valid and more crowded towards the aperture, cut by transverse striæ, which are irregularly alternately larger and smaller. Aperture oblique, elongate-ovate, constricted close to the suture. Outer lip thin, sharp, with a well-marked sinus, about three millimetres deep, with its centre 2·5 mm. from the suture, with the sides convex, and a concave bottom at the row of tiny nodules in front of the groove; a shallow anterior wide sinus just behind the notch of the canal. Canal very short, wide, open, notch rather large, oblique, its left border produced beyond the right; margins slightly everted. Columella straight, slight sinistral deviation anteriorly, smooth from removal of sculpture, callus very thin, applied, inconspicuous, barely free at the anterior extremity. Ornament greyish-white, with small deep rust-colored spots on the rows of grsnules

just below the suture (sometimes continued from these as wavy longitudinal lines), and on the spiral row just below the groove of the sinus, and finer spiral lines of spots on alternate transverse rows of costal granules, over the body-whorl to the base. Aperture white. Operculum moderately large, elongate-ovate acute (Pl. vii., fig. 3c).

Length, 20 mm.; breadth, 8·25 mm.; aperture length, 10·25; width, 3·25.

Type in my cabinet.

Habitat.—Five examples alive in 15 fathoms off Thistle Island, in weed, brought up in two successive casts off the dredge *(Verco)*.

Diagnosis.—*S. Quoyi*, Rve., is a larger shell, with the subsutural band not at all or scarcely nodulated, and with large nodules in the groove of the sinus, and no longitudinal costæ. *S. Oweni*, Gray, has in the spire-whorls the sinus nodules immediately above the suture, instead of at or slightly above the centre of the whorls. The nodules are only half as numerous, 20 in the body-whorl instead of 40; its longitudinal plicæ are very fine, and are just twice the number of the nodules.

It is named after Dr. R. H. Perks, the Secretary of our Section, a naturalist well known in South Australia.

The character of the operculum with its apical nucleus suggests a doubt whether this shell should be placed in *Surcula*. According to Fischer, in his Manuel de Conchyliologie, p. 591, this genus has an operculum with its nucleus medio-lateral and internal like that of *Clavatula*, of which he gives a figure. I find, however, that the operculum of *Surcula Quoyi* has its nucleus apical. The two shells are conchologically closely allied. I place my species, therefore, with it, in *Surcula* for the present, and leave the character of the operculum and its importance as a generic diagnostic for further consideration.

Turricula apicitincta, *spec. nov.* Pl. viii., figs. 4, 4a, 4b.

Shell turretted, fusiform, rather thin, shining. Spire, elate of eight whorls, including nucleus. Nucleus distinct dextral, two turns, excentric, sometimes slightly mammillate, smooth, suture well marked, pinkish brown, retaining its color in the dead white shell, and prettily tinting its apex. Spire-whorls sloping, scarcely convex, the convexity varying in different individuals. Longitudinally finely costate throughout; costæ most valid in the earlier whorls, about 35 in the penultimate, slightly nodulated at the posterior suture, wider than the interstices in the earlier whorls, narrower in the later, rounded, rather broader than high; sutures distinct impressed. Transverse liræ numerous, three in the penultimate whorl, flattened, wider than the interstices,

which are scarcely more than incisions, crossing the costæ, but less valid there than in the intervening furrows. In the first three whorls, just below the suture (the distance increasing gradually in successive whorls) a well-marked transverse furrow cuts off a row of subsutural nodules from the costæ; in the fourth whorl this is less marked, and the other spiral furrows become nearly equal to it, gradually diminishing in depth towards the centre of the whorl. Last whorl subconvex, convexity varying slightly in different specimens, contracted just below the periphery. Longitudinal plicæ numerous, close-set, irregular in size and distance, degenerating into marked incremental striæ towards the aperture. Spiral incisions well marked below the suture to the middle of the whorl, obsolete in front of this, though still visible under the lens; five or six valid spiral furrows over the contracted part behind the notch. Aperture obliquely elongately oval. Outer lip nearly straight in the upper two-thirds, then bent to the left at an angle of 135°; simple, acute. Columella straight for one-half its extent, then slightly bent to the left; plicæ four, sometimes the last forms the margin of the canal, sometimes is distinctly above it, equidistant, well marked, sometimes ceasing at the margin of the callus of the inner lip, which is sharply defined and at the lower part free, so as to form a minute rimate perforation with the varix of the notch. Canal wide, short, scarcely reflected, distinctly notched. Ornament, color greyish-white, a broad indistinct pinkish-brown subsutural band, maculated at intervals with deeper brown patches; in some examples only these are visible. On the body-whorl three indistinct fine bands either continuous or composed of brown dots, the highest of which appears on the spire-whorls, the lowest may be continuous over the anterior part of the shell from a little above the columellar plicæ. When dead, the shell is nearly pure white with a pinkish tip, and faint brownish maculations.

Length, 11·20 mm.; breadth, 3·5, or 10 mm. and 3·75; length of aperture, 4·5 mm.; width, 1 mm.

Diagnosis.—It resembles *M. Tasmanica*, Ten.-Woods. (lent to me by Mr. May, of Hobart), in the ribbing and transverse girdling, but the shape is different. The latter is ovate and attenuate at both ends, with these dimensions: 11 mm. long., 5 mm. broad; length of aperture, 6 mm. fully. It is brown, with two or three yellowish-white bands—mine is greyish-white, with brown bands, but this distinction may simply be a question of width of bands, in which circumstance mine vary widely.

Habitat.—St. Vincent Gulf, 17 fathoms, six dead; off Newland Head, 20 fathoms, nine dead *(Verco)*.

Types in my cabinet.

Imbricaria porphyria, *spec. nov.* Pl. viii., figs. 5, 5a.

Shell ovate-conic, solid, of five whorls, exclusive of nucleus. Nucleus two whorls, smooth, flattened, papillary. Spire short, slightly acute, about one-fourth the total length of the shell, whorls subconvex, roundly angled at lower part, longitudinal plicæ indistinct, low, inequidistant, closer on the posterior whorls, with finer distinct regular longitudinal striæ under the lens. Spiral striæ, about seven on the penultimate whorl, sublenticular, flat crowded, crossing the plicæ. Sutures distinct, very slightly margined, and minutely crenulated by the longitudinal striæ. Body-whorl swollen just below the suture to form a rounded shoulder, then with a regular sloping curve to the anterior extremity. Fine sublenticular longitudinal growth-lines, close, most marked at the suture, and behind the shoulder, less marked near the aperture; spiral striæ close-set, low, most marked behind the shoulder, and just above the notch, very faint over the rest of the whorl. Aperture narrow, widest in the middle, outer lip nearly straight, simple, acute, smooth. Inner lip straight, very thin polished callus. Three very distinct, equal, nearly transverse, equidistant plaits occupying the middle third of the aperture with an obsolete one immediately below. Ornament, uniform mauve tint inside and out, nucleus dark mauve; dead shells are white.

Length, 10 mm.; breadth, 5·75 mm.; spire, 2·25 mm.; length of aperture, 7·25; width, 1·25.

Habitat.—In and outside Backstairs Passage, Investigators Straits, dredged alive at 15 to 20 fathoms, five; and 36 recent and dead *(Verco)*. West Coast of Yorke Peninsula *(Tate)*.

Types in my cabinet.

P. Fischer in his Manuel de Conchyliologie, p. 614, says *Imbricaria* of Schumacher has no operculum. The shell I describe has one, but I leave the discussion of its generic location for a future communication.

Phos tasmanica, *Ten.-Woods (Josepha)*. Pl. vi., figs. 5, 5a; Pl. viii., figs. 6, 6a.

Shell ovately fusiform, solid, opaque. Whorls including the nucleus 9; nucleus of two whorls, smooth, inflated. Spire-whorls convex, angled at their centre, behind this slightly excavated by a rather wide, conspicuous groove, behind this a prominent rounded subsutural band. Longitudinal plicæ numerous, regular, 16 in the penultimate whorl, slightly coronated at the angle, and forming slightly elongated nodules on the subsutural band. Distinct engraved spiral lines, crossing the plicæ, three or four in front of the angle, two or three in the groove, producing, if well marked, a row or two of small round granules there. Body-

whorl with the subsutural nodulated band, anterior to this the excavated groove, followed by its angle of junction with a uniform, slightly convex surface. The longitudinal plicæ may extend almost to the base, or may become obsolete at the periphery; and generally become less marked towards the aperture in older shells. Spiral engraved lines 13 to 15, equidistant, most marked at the base, so as to form there about five obliquely rounded spiral liræ. Aperture obliquely elongate-ovate, contracted behind between the subsutural band and a small columellar callus, minutely canaliculate. Outer lip simple, thin, slightly sinuous, internally seven narrow spiral plicate teeth, equidistant, extending to within a line of the margin. Columella nearly straight, concave at the base, where the callus is thick and closes the umbilicus; a rather broad spiral plica lies over the situation of the continuation backwards of the varix of the notch, it may be simple or bifid or three or four divided. Notch well marked, with minutely everted margins, varix of notch valid, and bounded above by a definite slightly elevated edge continuous with the sharp right margin of the notch. Ornament, rusty-brown or deep mahogany, with bluish-white patches composed of several oblong spots disposed between the engraved lines, most numerous just above and below the angulation and towards the base. In these areas the brown and whitish spots may be almost regularly articulated, or so disposed as to form longitudinal brown flames. Living shells are often brightly glistening, dead shells uniform dull rusty brown.

Length, 25 mm.; breadth, 10 mm.; spire, 14 mm.; aperture, 10 mm. long, 4·5 broad.

Habitat.—Along the whole coast of South Australia, at low water. Eyre's Sandpatch, West Australia, large specimens.

Remarks.—This shell has been known in South Australia as *Cominella suturalis*, A. Adams see list of Aquatic Mollucea of South Australia, D. J. Adcock, 1893. But that shell is a *Nassaria*, and as figured in Tryon's Man. of Conch., pl. 84, fig. 542, and as examined in a specimen sent to me identified by G. B. Sowerby, is a shell quite unlike the South Australian form. The dentition of *Nassaria*, as given in the Man. Vol. 3, pl. 27, fig. 34, shows a six-cusped rachidian tooth, while our shell has only three cusps. I had identified it as *Josepha Tasmanica*, Ten. Woods, Pros. Roy. Soc., Tasmania, 1878, p. 32, upon which he founded his subgenus *Josepha;* but it had never been figured, and on enquiry it was learned that the type specimens in the Hobart Museum had been mislaid, and could not be referred to. However, Miss Lodder, of Ulverstone, Tasmania, has lately forwarded to me two shells, identical with this *Phos Tasmanica.* They were found without a label among some shells presented by

Mr. Petterd to the Launceston Museum, and a label *Josephia Tasmanica*, in his handwriting, was found in the same box without any shells attached. Mr. Petterd, to whom she referred them, says he believes these shells are the co-types of Wood's species, which was described from shells in Mr. Petterd's possession. There is, therefore, no doubt about the identity. As to its generic location : Woods created the subgenus *Josepha* for it under *Cominella*, because of its columellar plait, but Tryon says, "If it is really distinct from *Cominella*, why is it not a *Phos?*" Man. of Conch., Vol. 3, p. 207. I know of no reason why it should not be regarded as a Phos. Its dentition, given on pl. viii., fig. 6, is identical with that of the genus Phos given in Tryon's Man. Vol. 3, pl. 27, fig. 35. Its shape approximates that of *Phos virgatus*, Hinds, op. cit., pl. 83, fig. 502, and it has a columellar plication. This varies in validity in different examples, but is always present, and is not merely a projection of the varix of the notch through a thin layer of columella callus. For this callus at its *margin* may be quite devoid of a plication, which is yet distinct enough a little further within the aperture, where it may show two, three, or four ridges which have been subsequently laid down. I have, therefore, placed it in the genus *Phos*, and discarded the subgenus *Josepha*.

Myodora corrugata, *spec. nov.* Pl. viii., figs. 1, 1a, 1b.

Shell transversely ovate, thin, subequilateral, inequivalve Umbos apposed, acute, retroflexed. Anterior dorsal margin uniformly slightly convex. Posterior dorsal margin uniformly slightly concave; the two forming an angle of about 130°. Ventral margin slightly convex, anteriorly rising rapidly to form a well-rounded curve with the front dorsal margin; posteriorly forming a marked angle, slightly more than a right angle, with the truncated posterior extremity; in large specimens the ventral margin is slightly concave in front of this angle. Posterior extremity almost vertically straightly truncated, the end sloping slightly downwards and forwards, making a right angle with the post-dorsal margin. Right valve convex, well-marked ridge from umbo to postero-inferior angle; sculptured with very distinct, regular, concentric ribs, about one-half the width of the interspaces, and as high as wide, smooth and rounded, continuous from one dorsal margin to the other. Left valve a little smaller than the right, almost flat, very slightly rounded transversely, an indistinct ridge from umbo to postero-inferior angle, behind which the surface is quite flat; sculpture like that of the right valve, but not quite so deep, especially behind the umbonal ridge. There is a long narrow post-umbonal area on the dorsal hinge-line, smooth, slightly excavated, the right valve composing rather

the larger part. Ventral margin very thin and simple. Internally, valves shining, pearly, indistinctly marked by tha corrugations of the outside, furrows within corresponding with ridges without. A small triangular cartilage-pit within each apex; there is a small umbonal ossicle. The right valve has a long linear furrow, with a scarcely projecting long lamina at its inner margin, for the reception of a long lamina on the left valve along the whole of the post-dorsal margin. The edge of the anterior-dorsal margin of the right valve scarcely projects, so as to enclose the left valve, and allow it to rest on the ledge within.

Length, antero-posterior, 14·25 mm.; umbo-ventral, 9 mm.; sectional diameter of apposed valves, 3·5 mm.

Habitat.—Dredged alive, 15 to 20 fathoms, Yankalilla Bay, Backstairs Passage, and Spencer Gulf five specimens, and 23 valves *(Verco)*.

Corbula compressa, *spec. nov.* Pl. viii., figs. 2, 2a, 2b.

Shell triangulary oval, solid, compressed, inequivalve, inequilateral. Umbols in contact, acute, curved slightly forwards. Posterior dorsal margin sloping, straight for two-thirds of its length, then descending at an obtuse angle. Anterior dorsal margin about three-fourths as long as the posterior, with which it makes rather more than a right angle, scarcely excavated in front of the umbos, and forming a well rounded anterior extremity with the ventral margin. The front half of this is straight, then slightly convexly ascending, to join the posterior dorsal margin at its junction with which it is slightly excavated, so as to form a minute beak. The right valve is larger than the left. Along the anterior dorsal margin, the rounded front end, and the anterior two-thirds of the post-dorsal margin, the right valve scarcely projects beyond the left. At the posterior extremity it is deeply folded over it at a very slightly rounded angle, the depth of the fold diminishing anteriorly. From the umbo on each valve a ridge curves obliquely forwards, but is soon lost in the rounded surface of the valves; another extends obliquely backwards to the posterior inferior angie, sharply defined. The post-umbonal area is, in the left valve, somewhat excavated throughout; in the right convex, except for a slightly concave groove close to the ridge, diminishing in width from the umbo backwards. Sculpture, concentric incremental striæ, more distinct and at wider intervals with age, fewer and more valid in the left valve; in the left posterior umbonal area forming distant sharp ridges, in the right being very numerous and fine. In some specimens are radial interstitial raised microscopic striæ on both valves, more marked on the left. Ornament china-white, mottled with small translucent brown irregular zigzag spots, arranged somewhat radially.

Length, 10 mm.; breadth. 6·25 mm.; thickness, 4 mm.

Habitat.—Yankalilla Bay, in sludge, at 20 fathoms, many alive; Backstairs Passage, Port Lincoln, Eastern Cove, Kangaroo Island, at varying depths, several *(Verco).*

Types in my cabinet.

Diagonsis.—Its nearest ally in our waters is *C. scaphoides*, Hinds, but the latter is a more obese shell, the transverse section is more uniformly convex, the anterior dorsal margin is comparatively longer, the angle between the anterior and posterior margin is more obtuse, the left valve is not so included in the right posteriorly, the surface behind the umbonal ridge is not so wide, or so excavated, and so the ridge is not so valid. A nearer ally is *C luteola*, Carpenter, from San Diego Bay, which has the same compressed form, but in this species the anterior part of the shell is longer than the posterior, the junction between the anterior dorsal margin and the ventral is a larger curve, and the right valve does not include the left.

Note Upon Murex Umbilicatus, *Ten.-Woods.* Pl. vii., figs. 4, 4a, 4b, 4c.

Adams's name *scalaris* has priority of Wood's *umbilicatus*, but the former is pre-occupied by Brocchi for a fossil *Murex*, and is thus excluded. So Tryon proposed the name of *M. Angasi* as a substitute for *scalaris* (Man. of Conch. Vol. II., p. 109). He did not, however, know its identity with *M. umbilicatus.* This latter name, therefore, has priority. The identity is vouched for by Brazier. He sent specimens of the shell to H. Adams, who said it was identical with that named *M. scalaris* by his brother, A. Adams (Proc. Linn. Soc. New South Wales, Vol. VIII., Part I., p. 116). Sowerby, in Thes. Conch. Mon. Murex, p. 54, gives it in his alphabetical list as *scalaris*, Ad., Gen. Fusus ?, without description or plate, and does not notice it in his Mon. Fusus. Tryon gives no plate of either *scalaris* or *umbilicatus;* I have therefore had a figure of *M. umbilicatus*, Ten.-Woods, from St. Vincent Gulf, with its operculum executed.

EXPLANATION OF PLATES.

Plate VI.

Fig.	
1, 1a.	Tritonidea fusiformis, *Verco.*
1b.	Details of sculpture.
2, 2a.	Var. Adcocki, *Verco.*
3, 3a, 3b.	Harpa punctata, *Verco.*
4, 4a.	Voluta translucida, *Verco.*
5, 5a.	Phos tasmanica, *Ten.-Woods.*
6.	Triton (Argobuccinum) mimeticus, *Tate.*
6a.	Operculum of Triton (Argobuccinum) mimeticus.
6b.	Dentition of Triton (Argobuccinum) mimeticus.

Plate VII.

1, 1a, 1b. Drillia telescopialis, *Verco.*
2, 2a. Drillia pentagonalis, *Verco.*
3, 3a. Surcula Perksi, *Verco.*
3b. Surcula Perksi, details of sculpture.
3c. Surcula Perksi, operculum.
4, 4a. Murex umbilicatus, *Ten.-Woods.*
4b. Murex umbilicatus, details of sculpture.
4c. Murex umbilicatus, operculum.

Plate VIII.

1, 1a, 1b. Myodora corrugata, *Verco.*
2, 2a, 2b. Corbula compressa, *Verco.*
3. Mitra Vincentiana, *Verco.*
4, 4a. Turricula apicitincta, *Verco.*
4b. Turricula apicitincta, details of sculpture.
5. Imbricaria porphyria, *Verco;* 5a. Operculum, anterior extremity probably broken off.
6. Dentition of Phos tasmanica, *Ten.-Woods.*
6a. Operculum of Phos tasmanica, *Ten.-Woods.*

1

1a

1b

2

2a

3

3b

3a

4

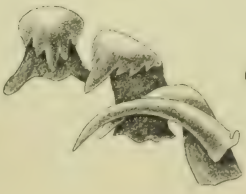
4a

5

5a

6

6a



6b

H.B. lith.

1

1a

1b

2

2a

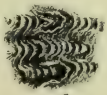
3

3b

3c

3a

4



4b

4c

4a

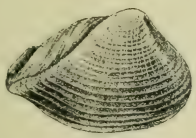
H.B. lith.

Hussey & Gillingham, Lith.

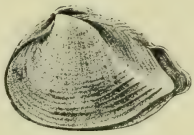
1

1 b

1 a

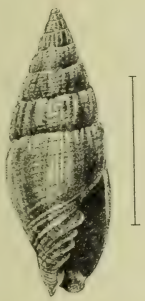


2



2 a

2 b



3

4

4 b

4 a

6 a

5

5 a

6

H.B. lith.

HUSSEY & CUNNINGHAM LITH

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 6, 1896.]

XX.

PECTINICORNES.

AULACOCYCLUS.

A. errans, sp. nov. Minus latus; minus convexus; nitidus; rufo-brunneus; vertice cornuto, cornu adunco supra sulcato in apice emarginato; prothorace sulco marginali excepto sublævi (ut *A. edentuli*, Macl.), utrinque pone medium fovea curvata impresso; elytris minus fortiter striatis, striis æqualiter valde distincte punctulatis, puncturis in striarum interiorum parte antica quam in striis exterioribus haud minus perspicuis, interstitiis nullo modo convexis. Long., 11 l.; lat., 4 l.

The species of *Aulacocyclus* are extremely closely allied *inter se*, and most of the characters that have been relied upon in the brief published descriptions seem to be in reality of little value. The form of the frontal horn is certainly liable to some variation and the number of external teeth on the front tibiæ sometimes differs in the two tibiæ of the same specimen. Nor is the form and sculpture of the lateral fovea of the prothorax constant; I have examples in which the two fovea of an individual specimen are by no means identical. The only constant characters I can find (apart from the size which does not seem to vary much) are in the striation and puncturation of the upper surface. The present species is very easily recognised by its prothorax almost without puncturation (as in *A. edentulus*, Macl., the commonest species of the genus in my experience) in combination with elytra comparatively feebly striate but having their striæ extremely evenly punctulate (so that the punctures are scarcely less defined in the front part of the subsutural striæ than in the lateral striæ.

Australia; I do not know the exact habitat but believe it to be tropical.

A. collaris, sp. nov. Minus latus; modice convexus; nitidus; niger; vertice cornuto, cornu adunco supra sulcato in apice emarginato; prothorace subtiliter distincte sat crebre punc-

tulato, utrinque pone medium fovea curvata (hac haud vel minus distincte punctulato) impresso; elytris fortiter striatis, striis interioribus vix distincte (*ut A. edentuli*, Macl.) exterioribus sat fortiter (quam *A. edentuli* magis fortiter) punctulatis, interstitiis sat fortiter convexis. Long., 10—11 l.; lat., $3\frac{3}{5}$—4 l,

Easily distinguishable by its prothoracic puncturation much more distinct than in any other (at any rate than in any other known to me) of its congeners, in all of which the punctures are very sparse and discernible only with a strong lens (*e.g.*, a Coddington), while in the present species they are notably less sparse and quite distinct under a very ordinary lens. Compared with *A. edentulus* moreover this insect is smaller, narrower, more nitid and blacker, with the punctures of the external elytral striæ very much stronger. The elytral interstices moreover are evidently more convex than in *A. edentulus*, but I do not lay much emphasis on this character as the interstices of the elytra seem to vary in convexity within the limits of a species,—probably sexually.

The genus *Aulacocylus* is one presenting very great difficulty on account of the externally close alliance *inter se*, and the brevity of the descriptions, of its species. Seven names have I believe been given to Australian species (if *Rosenbergi*, Kaup, be Australian which however seems doubtful). Two of these (according to Gemminger and Harold) are synonyms of *edentulus*, Macl., and this is probably a correct reference. *Kaupi*, Macl., I strongly suspect of being another synonym of the same species. *Rosenbergi*, Kaup, and *Percheroni*, Kaup, seem incapable of identification without examining the types. They are said to be remarkable for the shortness of their frontal horn and the feebleness of their elytral puncturation. Gemm. and H. regard them as referring to only one species. *Teres*, Perch., seems to be a good species (unknown to me) fully twice as large as the species I have described above. I have examined the type of *edentulus*, Macl., and I think it is the species Burmeister applies the name to, though in that case his description cannot be called a good one, as it emphasises characters that do not seem to be constant.

LAMELLICORNES.

ISODON.

I have lately had occasion to attempt the determination of a number of examples some (at least) of which are referable to this genus, and have arrived at a conviction that no satisfactory generic distinction can be drawn among the Australian species that have been referred to *Isodon* and *Heteronychus*. On first

thoughts these two genera might be supposed incapable of confusion, because according to their diagnoses (*e.g.*, Lacordaire's Gen. Col., vol. III.) *Heteronychus* should have organs of stridulation on the propygidium and unequal claws on the front tarsi of the male, while in *Isodon* the organs of stridulation should be wanting and the male claws simple. But I find various combinations of these characters in species that are extremely closely allied even specifically, some with organs of stridulation having equal and others unequal claws in the male.

The species that I am referring to agree in the following characters which in combination distinguish them from all other Australian *Dynastides* known to me,—viz., prothorax usually with well-marked sexual characters (in no instance known to me quite alike in the sexes), hind tibiæ with very strong apical ciliæ, basal joint of hind tarsi only feebly dilated at the apex, club of antennæ not extraordinarily developed in the male, three external teeth (only) on the front tibiæ, one of the two apical spines of the hind tibiæ inserted more or less behind the base of the tarsus (in *Nephrodopus*, &c., it is differently placed), mentum of normal form (not as in *Teinogenys*, &c.), head not armed with a horn in either sex (at most a very small conical tubercle), clypeal suture well defined and not strongly angulate hindward in the middle (as it is in *Dasygnathus*, &c.), sides of clypeus sinuate, mandibles visible, labrum not prominent, front marginal furrow of prothorax not angulate hindward in middle (as it is in *Adoryphorus*, &c.).

Fourteen Australian species presenting the above characters have been described (inclusive of *Cheiroplatys pecuarius*, Reiche, which I have no doubt is an *Isodon*). Of these three (viz., *I. lævicollis*, Macl. and *glabricollis*, Macl. and *H. vulgivagus*, Oll.) appear to have been described without any knowledge of the male, and as the characters necessary to be known before their males can be identified are not given, I fear they must be treated as incapable of certain identification from description. Nevertheless, I am fairly confident that I have not seen any of them. *I. subcornutus*, Fairm, is probably identical with *pecuarius*, Reiche, so that there are only ten species of which the male has been described.

Four of these ten were described by Burmeister, but unfortunately very briefly ; *Australasiæ*, Burm., happens to possess well-marked characters by which it can be identified, but the other three (all from W. Australia) present great difficulties. *P. curtus*, Burm., is described without the mention of a single valuable character, unless it be "the second row of punctures from the suture (on the elytra) is the least regularly seriate." I have

not seen any species presenting that peculiarity.* *P. laticollis* has no characters assigned to it that seem really distinctive beyond that the prothorax is scarcely punctulate and the elytra has nine straight rows of punctures; characters which I cannot find in combination in any *Isodon* before me. *P. lævigatus* seems to be a peculiar species with the upper surface almost lævigate and the clypeus not at all produced; I have before me several species almost without puncturation on the upper surface, but the only one that has not some other strongly marked character (totally inconsistent with its being *lævigatus*) has the clypeus more strongly produced than in any other *Isodon* known to me. I find it difficult to believe that none of these three species are before me, and yet I am compelled to proceed on that assumption.

Reiche has described one species *(pecuarius)*. It is common and widely distributed, and is possibly identical with *curtus*, Burm.

The remaining five species are Sir W. Macleay's. Two of these *(Heteronychus*† *picipes* and *irregularis)* are black species with two tubercles on the clypeal suture, which I am confident that I have not before me. One species (*Heteronychus lucidus*, from King's Sound, N.W.A.) is described as having the prothorax of the male with a frontal tubercle but without any excavation; I have not seen this species. *Isodon picipennis* (from King's Sound, N.W. Australia) is described as being black except the elytra which are red, the prothorax impunctate except on the anterior and lateral margins and the elytra coarsely punctulate; I have not seen any species likely to be this one; there is no information given regarding the claws of the male or the organs of stridulation, so I cannot place it. *Isodon puncticollis* is known to me, Mr. Masters having lent me a type.

It appears, then, that of the 14 descriptions existing of species attributable to the genus *Isodon* as I have characterised it above, one (and perhaps two) provides a synonym and that three are invalidated by their relating only to the female, so that only nine can be regarded as referring to decidedly distinct species

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* Since writing the above I have found among some *Dynastides* from W. Australia sent by Mr. Lea for my inspection a species which seems very likely to be *I. curtus*, Burm. The claws of its male are simple, and it has no organs of stridulation. It is quite distinct from all the species of *Isodon* described or tabulated in this memoir, *inter alia multa* by its considerably smaller size.

† Through the courtesy of Mr. Masters I had the advantage some time ago of seeing an example of *H. picipes*, but did not take sufficient note of it to say much about it now beyond that it is distinct from any of the species treated in the following pages. I can say, however, that one of the claws on the front tarsi of the male is bifid.

and that I have good reason to believe only three of those nine to be before me.

With these introductory remarks I will proceed to furnish a tabulated statement of the characters of the species known to me, from which I have to exclude all the species not in my possession on account of there not being one of them of which the organs of stridulation have been definitely described.

I regret that I am not able to deal more comprehensively with these insects, but hope nevertheless that my work (such as it is) will be useful as forming a foundation on which better work may be done in the future to elucidate a genus whose species have not yet been treated with anything more systematic than isolated diagnoses.

Referring to the diagnoses which follow I may say that I have not included in them characters that seem to be generic, such as the presence of villosity on the undersurface and legs, the antennal structure, &c., as it needlessly lengthens descriptions to include in them matters that do not concern specific distinctions.

A. Front claws of male simple.
  B. Propygium with organs of stridulation.
    C. These organs consist of two longitudinal rows of numerous fine rugæ.
      D. Base of prothorax with a continuous marginal border ... . *pecuarius*, Reiche.
      DD. Base of prothorax margined only close to the sides ... ... *puncticollis*, Macl.
    CC. The organs of stridulation consist of only one or two much larger and more elevated rugæ ... ... *Meyricki*, Blackb.
  BB. Propygidium devoid of organs of stridulation.
    C. Elytra very coarsely punctulate.
      D. Prothoracic puncturation comparatively fine ... ... *Australasiæ*, Hope.
      DD. Prothoracic puncturation extremely coarse ... ... *Terræ-reginæ*, Blackb.
    CC. Elytra with scarcely visible puncturation *nasutus*, Blackb.
AA. One of the front claws of male bifid (propygidium with organs of stridulation in all the species known to me).
  B. Two tubercles on the clypeal ridge.
    C. Elytra distinctly punctulate ... ... *bidens*, Blackb.
    CC. Elytra almost without puncturation ... *lævipennis*, Blackb.
  BB. Clypeal ridge without tubercles ... ... *intermedius*, Blackb.

I. Meyricki, sp. nov. Mas. Sat late ovatus; nitidus; obscure ferrugineus, capite prothoraceque nigricantibus, antennis palpisque brunneo-testaceis; clypeo sparsim punctulato, vix ruguloso, antice rotundato-truncato, marginibus sat reflexis, lateribus sat fortiter sinuatis; fronte a clypeo per carinam simplicem divisa, sparsim leviter ruguloso-punctulata; pro-

thorace quam longiori sesquilatiori, sparsissime subtilissime punctulato, antice sat profunde excavato, margine basali continuo quam margo anticus (hoc in medio tuberculo magno armato) ut $1\frac{3}{4}$ ad 1 latiori, angulis anticis obtusis antrorsum vix prominentibus posticis obtusis; scutello sat lævi; elytris subtilius sat leviter punctulatis (seriebus 3 inter callum humeralem et striam subsuturalem, serie 1^{a} a scutello et a callo humerali circiter æquidistanti, area lata inter seriem 1^{am} et striam subsuturalem lævi, seriebus 2 ultra callum humeralem, area lata inter series 3^{am} et 4^{am} confuse punctulata, area lata marginali fere lævi, parte apicali subfortiter punctulata); propygidio stridulationis organis instructo (his rugis paucis sat fortiter elevatis compositis); pygidio antice rugulose minus crebre punctulato, postice lævi; tibiis anticis extus fortiter tridentatis; tarsorum unguiculis simplicibus. Long., 6 l.; lat, $3\frac{1}{2}$ l.

Fem. latet.

The sculpture of the elytra is not unlike that of *I. pecuarius*, Reiche, but is more feebly impressed, with a comparatively wide marginal space almost impunctulate. The excessively fine and sparse puncturation of the prothorax and the different structure of the organs of stridulation at once separate this insect from *pecuarius*.

W. Australia; taken by E. Meyrick, Esq.

I. Terræ-reginæ, sp. nov. Mas. Sat breviter subovatus; sat nitidus; nigro-piceus, antennis palpis corpore subtus et pedibus dilutioribus; clypeo sparsius subtilius punctulato, antice abrupte truncato, angulis anticis extrorsum acutis, lateribus fortiter sinuatis fere angulatis; fronte a clypeo per carinam in medio vix tuberculatam divisa, sat fortiter crebre rugulosa; prothorace quam longiori paullo plus quam sesquilatiori, fortiter minus crebre punctulato, antice vix depresso, basi haud marginata quam apex (hoc in exemplo typico haud tuberculato) ut $1\frac{3}{4}$ ad 1 latiori, angulis anticis subacutis antrorsum leviter prominulis posticis rotundato-obtusis; scutello subtiliter sparsius punctulato; elytris grosse punctulatis (seriebus 4 inter callum humeralem et striam subsuturalem, serie 2^{a} a scutello et a callo humerali circiter æquidistanti, area sat angusta inter seriem 1^{am} et striam subsuturalem grosse confuse punctulata, puncturis grossis sat seriatim dispositis ad marginem lateralem continuis); stridulationis organis nullis; propygidio sat opaco sparsius squamose punctulato; pygidio nitido, puncturis sat grossis squamosis cum aliis minoribus sat crebre (prope apicem sparsim) impresso; tibiis anticis extus sat fortiter tridentatis; tarsorum unguiculis simplicibus.

Fem. latet. Long., $6\frac{1}{2}$ l.; lat., 4 l (vix).

Closely allied to the species which I take to be *I. Australasiæ*, Hope, differing from it chiefly by the frontal carina being scarcely tuberculate and the prothorax considerably more rounded on the sides and much more coarsely punctulate.

Queensland.

I. nasutus, sp. nov. Mas. Late ovatus; brevis; nitidus; piceus, capite prothoraceque obscurioribus, antennis palpisque rufis; clypeo anguste valde producto, sat crebre ruguloso, antice reflexo-truncato, marginibus leviter reflexis, lateribus fortiter subangulatim sinuatis; fronte a clypeo per carinam (hac in medio quam latera versus paullo magis elevata) fere rectam divisa, sat crebre rugulosa; prothorace quam longiori paullo plus quam sesquilatiori, vix perspicue punctulato, antice sat profunde excavato, basi haud marginata quam apex (hoc in medio tuberculo acuto armato) duplo latiori, angulis anticis sat acutis sat prominulis posticis rotundatis; scutello lævi; elytris sublævibus nitidissimis (seriebus circiter sex punctu-rarum obsoletissimarum et puncturis obsoletis prope apicem nonnullis vix perspicue impressis); propygidio (hoc stridulationis organis haud instructo) pygidioque leviter sparsim punctulatis; tibiis anticis extus fortiter tridentatis; tarsorum unguiculis simplicibus.

Fem. latet. Long., $6\frac{1}{2}$ l.; lat., 4 l.

This species, as noted above, must be much like *I. lævigatus*, Burm., but its strongly and comparatively narrowly produced clypeus is qaite inconsistent with its being that insect.

W. Australia.

I. bidens, sp. nov. Mas. Subovatus, minus latus; sat nitidus; rufobrunneus, antennis palpisque dilutioribus; clypeo sat late minus fortiter producto, sat crebre ruguloso, antice bidentato, marginibus sat reflexis, lateribus minus fortiter sinuatis; fronte a clypeo per carinam in medio sat fortiter bituberculatam (hac inter tuberculos interrupta) divisa, antice crebre subtilius rugulosa postice sublævi; prothorace quam longiori sesquilatiori, sparsim subtiliter punctulato, antice leviter excavato, basi haud marginata quam apex (hoc in medio fortiter bituberculato) fere duplo latiori, angulis anticis minus prominulis subacutis posticis rotundato-obtusis; scutello sublævi; elytris subfortiter punctulatis (seriebus 4 inter callum humeralem et striam subsuturalem, serie 1^{a} a scutello et a callo humerali circiter æquidistanti, seriebus 2 ultra callum humeralem, area inter series 4^{am} et 5^{am} confuse punctulata, area ultra seriem 6^{am} fere lævi, parte apicali subfortiter punctulato); propygidio stridulationis organis instructo (his rugis numerosis minus elevatis com-

positis); pygidio fere lævi vel puncturis sparsissimis vix impresso; tibiis anticis extus fortiter tridentatis; tarsorum anticorum unguiculo externo bifido.

Fem. differt prothorace antice haud tuberculato, magis perspicue punctulato; unguiculis simplicibus; segmento ventrali apicali magis elongata, postice haud emarginato. Long., $7\frac{1}{2}$—8 l.; lat., $4\frac{1}{5}$—$4\frac{2}{5}$ l.

The male is easily recognised by the tubercles arranged in three pairs—one pair on front of the clypeus one on the clypeal suture and one on the front margin of the prothorax. If *Heteronychus vulgivagus*, Oll., was founded on a female example (as seems probable from the description) it is just possibly this species. The female however does not agree satisfactorily with Mr. Olliffe's description which mentions eight rows of punctures on the elytra—a number that can be attained only by counting in the confused puncturation between the rows—nor is the form of the clypeus at all satisfactorily characterised by the expression "head bisinuate in front." It may be noted that the male of this species (as of all its allies) has the apical ventral segment short, and gently emarginate behind; also that in this species the prothoracic quasi-excavation is small in area and is little more than a slight flattening of the surface.

N. Queensland; sent to me by Mr. French.

I. lævipennis, sp. nov. Mas. Ovatus, minus brevis; nitidus; brunneus, antennis palpis coxisque dilutioribus; clypeo modice producto, sat fortiter (plus minusve transversim) ruguloso, antice bidentato, marginibus modice reflexis, lateribus modice sinuatis; fronte a clypeo ut *I. bidentis* divisa, sat fortiter (postice minus distincte) ruguloso; prothorace quam longiori sesquilatiori, vix manifeste punctulato, antice subfortiter excavato, basi haud marginata quam apex (hoc in medio tuberculo parvo armato) plus quam duplo latiori, angulis anticis subacutis subprominulis posticis rotundato-obtusis; scutello sublævi; elytris fere lævibus, striis vix manifestis vix manifeste punctulatis impressis; propygidio stridulationis organis instructo (his rugis circiter sex sat elevatis compositis); pygidio sublævi; tibiis anticis extus minus fortiter tridentatis; tarsorum anticorum unguiculo externo bifido.

Fem. differt prothorace nec excavato nec tuberculato; unguiculis simplicibus; segmento ventrali apicali magis elongato, postice haud emarginato. Long., 6—8 l.; lat., 4—$4\frac{1}{2}$ l.

Easily distinguished from all known to me of its congeners by its elytra devoid of puncturation or at most with only a few punctures here and there, and they so faintly impressed as to be

scarcely traceable. The prothoracic excavation of the male is of small area but moderately deep.

W. Queensland (Mr. French); also taken by me near Oodnadatta in Central Australia.

I. intermedius, sp. nov. Mas. Sat late ovatus; nitidus; piceo-brunneus, antennis palpis pedibusque rufescentibus; clypeo minus producto, sat crebre ruguloso, antice rotundato-truncato, marginibus sat late sat fortiter reflexis, lateribus modice sinuatis; fronte a clypeo per carinam simplicem sat elevatam divisa, ut clypeus rugulosa; prothorace quam longiori plus quam sesquilatiori, sparsim subtilissime punctulato, antice sat fortiter excavato, basi haud marginata quam apex (hoc in medio tuberculo modico armato) plus quam duplo latiori, angulis anticis minus prominulis vix subacutis posticis rotundatis; scutello sublævi; elytris sat subtiliter punctulatis (seriebus 4 inter callum humeralem et striam subsuturalem, serie 2ª a scutello et a callo humerali circiter æquidistanti, area minus lata inter seriem 1ªm et striam subsuturalem puncturis nonnullis impressa, parte extra seriem 4ªm confuse punctulata sed 1 vel forte 2 series sat distinctas ferenti, parte submarginali antice sat lævi postice subtiliter punctulata); propygidio stridulationis organis instructo (his rugis numerosis minus elevatis compositis); pygidio nitido, antice et latera versus sparsim punctulato; tibiis anticis extus sat fortiter tridentatis; tarsorum anticorum unguiculo externo bifido.

Fem. latet. Long., 7 l.; lat., $4\frac{1}{2}$ l.

Superficially this species closely resembles *I. pecuarius*, Reiche, *puncticollis*, Macl. and *Meyricki*, Blackb., and it would certainly be most unnatural to separate it from them generically—nevertheless its claw structure places it with *I lævipennis*, Blackb., and *bidens*, Blackb., which if I had not seen this species I should be disposed to regard as generically distinct from *I pecuarius*, &c. The prothoracic excavation in this species is large and deep as in *I. Meyricki*.

Queensland.

CHEIROPLATYS.

This genus is distinguishable from the other Australian *Dynastides* by the following characters in combination, viz., prothorax not simple in either sex (a tubercle or horn on the front margin in both sexes), hind tibiæ strongly ciliated at apex, basal joint of hind tarsi only moderately dilated at apex, club of antennæ not extraordinarily developed, front tibiæ externally bidentate or scarcely dentate at all in the male (tridentate in the female), one of the two apical spines of the hind tibiæ

inserted close to (or behind) the base of the tarsus, claws simple, mentum of normal form (not as in *Teinogenys*, &c.), head not armed with a horn in either sex, clypeal suture not or scarcely angulate in the middle, sides of clypeus not sinuate, mandibles invisible in repose, labrum strongly prominent, front marginal furrow of prothorax not or scarcely angulate hindward in middle, apical ventral segment traversed by a transversely sinuous furrow much more strongly defined in the female than in the male. All the species that I have examined are fulvo-hirsute on the underside and none of them have organs of stridulation. Eleven species have been attributed to this genus, of which two (*Ixion* and *porcellus*) are Boisduval's and are said to be identical with *curtus*, Guér., and *latipes*, Guér., respectively. As there is no evidence from Boisduval's descriptions that they are members of this genus I have no opinion as to the correctness of this alleged synonymy, but at any rate *Ixion* and *porcellus* may be eliminated from the list of valid species of *Cheiroplatys*. (*Scarabæus*) *curtus*, Guér., has been erroneously associated with *Cheiroplatys*, as Burmeister has pointed out. That learned author considers from the description that it is probably a *Dasygnathus*; to me the description reads more like that of a *Semanopterus*. To this latter genus I think Castlenau's species (*Phileurus subcostatus*) must certainly be referred, while (as pointed out above) *C. pecuarius*, Reiche, is an *Isodon*. Sir W. Macleay's two species (both from tropical Australia) seem to me very doubtfully referable to this genus, inasmuch as one of them (*C. inconspicuus*) is described as having its clypeus "broadly rounded and slightly emarginate in front" (a form to which no *Cheiroplatys* that I have seen approaches) and the other (*C. occidentalis*) as having its front tibiæ "bluntly tridentate" externally. If the type of *C. occidentalis* is a male (as the description implies) I doubt its being rightly placed in the genus; if it is a female it may be a *Cheiroplatys*, but in either case I am quite confident I have not seen it. Thus of the eleven species that have been associated with *Cheiroplatys* five must be definitely rejected, and two if rightly placed in the genus are very abnormal species that I have not seen. Of the remaining four I think I know *C. mælius*, Er., and I have examples which seem likely to be *C. latipes*, Guér., and *juvencus*, Burm. (as there does not seem to be any means of arriving at certainty on these identifications I propose furnishing characters that will enable these two species to be recognised, and claiming those names for them until cause be shown to the contrary). *C. lævipes*, Burm., I am fairly certain I have not seen. It is described as a large species (one inch long) with the clypeus strongly elevated in front, with the prothorax strongly punctulate in front but smooth along the base and

having a deep excavation in the male, and with the external margin of the front tibiæ entirely without teeth in the same sex.

The following is a tabulation of the species known to me of this genus. *C. lævipes* I have placed on the strength of characters furnished by Burmeister's description. Of *C. mælius* I have little doubt that I possess an example (from Tasmania), but it is a female, and moreover disagrees with the description in having a slight impression on its prothorax; it is better therefore not to risk confusion of synonymy by treating this identification as reliable, and the description (taken alone) is not detailed enough to enable me to point out distinctive characters. Neither of Sir W. Macleay's descriptions furnishes sufficient information for placing the species referred to in a tabulation, although (as already pointed out) characters are mentioned that satisfy me I have not seen the insects.

A. Base of the prothorax distinctly margined all across, scarcely obsoletely even in the middle.
  B. Two excavations on the prothorax (one behind the other, each preceded by a tubercle).
    C. Prothorax very sparsely punctulate ... *bifossus*, Blackb.
    CC. Prothorax closely punctulate ... ... *accedens*, Blackb.
  BB. Prothorax with only one excavation and one tubercle.
    C. Prothorax closely evenly and strongly punctulate ... ... *compactus*, Blackb.
    CC. Prothorax much more sparsely and finely punctulate ... ... *juvencus*, Burm.
    CCC. Prothorax closely punctulate in front, lævigate across the basal part... ... *lævipes*, Burm.
AA. Base of prothorax unmargined except close to the hind angles.
  B. Prothorax closely and strongly punctulate ... *latipes*, Guér.
  BB. Prothorax very sparsely and finely punctulate ... ... *pygmæus*, Blackb.

Regarding the statements of Burmeister and Erichson that the females of *C. juvencus* and *C. mælius* have no prothoracic impression, I may say that having examined a considerable number of females of this genus I have not seen one in which there is no trace of a prothoracic impression, and I am of opinion that the statements referred to are incorrect, their authors having either passed over a very slight impression as undeserving of mention or mistaken a female of another genus (*e.g.*, *Novapus* or *Isodon*) for a *Cheiroplatys*. I have invariably found that the female reproduces the prothoracic characters of the male in a modified form, *e.g.*, when the male has two strong excavations and two strong tubercles the female has two light impressions and two very small tubercles.

C. bifossus, sp. nov. Mas. Late subovatus; modice nitidus; colore variabilis (nigropiceus, vel brunneus); clypeo transversim ruguloso, antice truncato, marginibus erectis nec

altis (antice quam ad latera magis elevatis), lateribus rectis obliquis; fronte a clypeo per carinam sat rectam divisa sat rugulosa; prothorace quam longiori circiter sesquilatiori, longitudinaliter obsolete canaliculato, subtilius sparsius (antice ad latera sat crebre) punctulato, antice excavationibus 2 minoribus sat profundis impresso, ante excavationem utramque tuberculo magno armato, margine basali continuo quam margo anticus circiter ut $1\frac{3}{4}$ ad 1 latiori, angulis anticis acutis posticis rotundato-obtusis; scutello subtilius rugulose; elytris stria punctulata subsuturali profunda et puncturarum seriebus 8 (his per paria, vix manifeste in striis, dispositis) impressis, seriebus externis minus distinctis, pari 2° (a sutura enumerato) quam cetera breviori sed sat longe ultra elytrorum medium continuo, puncturis basin versus sat magnis sat profunde impressis postice gradatim subtilioribus, interstitiis inter paria puncturis (his serierum puncturis similibus) confuse impressis; pygidio confuse punctulato (sc. puncturis minutis sat crebris apicem versus minus crebris, et aliis majoribus apicem versus valde grossis, impresso); tibiis anticis fortiter dilatatis, extus ad medium subacute dentatis, parte dimidia apicali extus bisinuata. Long., 13 l.; lat., $7\frac{1}{5}$ l.

Owing to the reflexed front margin of the clypeus being gradually elevated from the sides to the middle and a little turned back, the front of the clypeus though in reality almost squarely truncate appears (if looked at from in front of it) to be strongly emarginate. The prothorax is scarcely narrower at its widest than the widest part of the elytra. A female example is unfortunately in extremely bad condition having evidently been found dead after long exposure to the elements. Its sculpture is much worn away and its front tibiæ are broken, but I can see that it has been almost identical with the male except in the prothoracic excavations much shallower, their tubercles very slight and the usual sexual differences in the ventral segments. Its form is somewhat narrower and more strongly convex than that of the male. The part of the apical ventral segment in front of the sinuous furrow is closely and rugulosely but not coarsely punctulate, the rest of the segment nitid and almost without punctures. Similar sculpture exists on the corresponding segment in the male, but the furrow is so faint and so near the front margin of the segment that the sculpture needs careful looking for. In this species the puncturation of the prothorax is distinctly sparse; if it be carefully examined it will be seen that the intervals between puncture and puncture (except near the front angles) are for the most part quite equal to twice the diameter of an individual puncture.

Victoria.

C. accedens, sp. nov. Mas. Præcedenti *(C. bifosso)* valde affinis; differt statura minus lata, prothorace quam longiori paullo minus quam sesquilatiori, crebre minus subtiliter punctulato, margine basali quam margo anticus fere duplo latiori, pygidio (parte antero-exteriori excepta) haud puncturis minutis impresso; cetera ut *C. bifossus*.

Femina quam mas paullo minus lata magis convexa, prothoracis excavationibus et tuberculis subobsoletis, tibiis anticis extus obtuse distincte tridentatis. Long., 10—12 l.; lat., 5—6½ l.

This species is so like the preceding *(C. bifossus)* that the detailed description of the latter may be read as applying to it, subject to the distinctions noted. The puncturation of the prothorax is very widely different; if it be closely examined it will be seen that the intervals between puncture and puncture are for the most part scarcely equal to the diameter of a puncture. I have seen half-a-dozen specimens of this insect apparently all taken in company by Mr. Lea, and have taken others singly myself, and find that they vary very little except in the development of the prothoracic inequalities and to some extent in the closeness of puncturation on the pygidium. I find throughout the Australian *Dynastides* that the sculpture of the pygidium is a singularly unreliable character. The sculpture of the apical ventral segment in this species is as in *C. bifossus*. The front of the clypeus (looked at from in front) appears a trifle less strongly emarginate.

N.S. Wales; Forest Reefs; also Blue Mountains.

C. latipes, Guér. I have seen only a single female example (which was taken near Sydney) of a *Cheiroplatys* that can be called "oblong," the term its author and also Boisduval use to describe the form of *C. latipes* or "elongate-cylindric" (Burmeister's term). As it agrees very fairly with the diagnosis in other respects I take the example in question to be *C. latipes*. It is however not the *Cheiroplatys* that is evidently most common in the neighbourhood of Sydney, which I believe to be *C. juvencus* and refer to under that name below. Its length is 11½ l., its breadth 5 l. Its color on the upper surface is nearly black, on the under-surface red-brown. Its head is like that of *C. bifossus* except that the clypeus is more evenly and less strongly elevated in front, so that looked at from the front it appears very little sinuate. Its prothorax has only one impression (fairly strong in the example before me) and one tubercle, with puncturation (even closer than in *C. accedens*) much stronger and closer than that of *C. bifossus*, the base is distinctly margined only close to the hind angle. Its scutellum has no punctures except in two small clusters near the front. Its elytra are sculptured much like those of *C. bifossus* except that the intervals between the sub-

sutural stria and the first pair of rows of punctures, and between the first and second pairs of rows of punctures (are not confusedly and rather closely punctulate but) bear only a few punctures and they placed interruptedly in a longitudinal direction. Its pygidium is somewhat irregularly studded with rather large isolated punctures with which fine punctures are not intermingled except in the antero-external corners (and there not very closely). In other respects the description of *C. bifossus* applies to the present species.

C. compactus, sp. nov. Mas. *C. bifosso* sat affinis; minor; prothorace excavatione 1 et cornu brevi 1 solis instructo, multo magis crebre magis fortiter (fere ut *C. accedentis*) punctulato; scutello (parte antica subtilius rugulosa excepta) lævi; elytrorum interstitio inter striam subsuturalem et puncturarum seriatarum par primum magis grosse minus crebre (et inter paria primum et secundum serie unica) punctulatis, parte submarginali et apicali multo magis crebre punctulata; pygidio puncturis minutis minus crebre vel vix impresso; tibiarum anticarum parte apicali dilatata haud extus bisinuata.

Feminæ prothoracis excavatione et tuberculo subobsoletis; tibiis anticis extus obtuse tridentatis. Long. $10\frac{1}{2}$—11 l.; lat., 6 l.

This species has a single large excavation and horn-like tubercle on its prothorax, with close comparatively coarse puncturation resembling that of *C. accedens*. Its elytra have their first interstice (between the subsutural stria and the first pair of rows of punctures) confusedly and strongly but not closely punctured, while the interstice between the first and second pairs of rows of punctures bears a single row of strong punctures. The pygidium of the male type has fine puncturation mixed with the coarser punctures but less closely than in *C. bifossus;* that of the females before me has very little fine puncturation. Compared with *C. latipes* (female) the female of this species is much less narrow and cylindric, with the prothorax evidently less closely punctulate, the first elytral interstice much more punctulate. The space in front of the furrow on the last ventral segment is closely rugulosely and somewhat finely punctulate.

S. Australia.

C. juvencus, Burm. The insect which I take to be this species is, I should judge, not uncommon in the neighborhood of Sydney; for though I have never taken it myself in my occasional collecting there I have not infrequently received it from Sydney correspondents. Comparing it with the description of *C. bifossus* (above) I find the following distinctions: the clypeus is very little elevated along its front margin and not more so in its

middle than at the sides, so that viewed from in front it appears only slightly emarginate; its size is much smaller (long., $8\frac{1}{2}$—11 l.); its prothorax has only one excavation (a very large one) and only one tubercle (which is of the form of a short horn); its scutellum is lævigate except near the front where it is finely and closely rugulose; its elytral puncturation is a little finer and much less plentiful, the first interstice bearing only sparse confused punctures, the interstice between the first and second pairs of rows of punctures only a more or less interrupted row of fine punctures, and that between the second and third pairs only fine punctures usually disposed in a more or less interrupted row; the pygidium is devoid or nearly so of fine puncturation; the space in front of the furrow on the apical ventral segment is in the female almost without punctures or (in some examples) very sparingly punctulate; the apical dilatation of the front tibiæ of the male is not bisinuate externally.

C. pygmæus, sp. nov. Fem. Sat late subovatus; *C. bifosso* affinis; differt statura multo minore; prothorace multo magis sparsim punctulato, excavatione et tuberculo unicis instructo, ad basin haud marginato; elytrorum interstitio 1° sparsim, 2° 3° que uniseriatim, punctulatis; pygidio puncturis minutis haud impresso; cetera ut *C. bifossus*. Long., $7\frac{4}{5}$ l.; lat., $4\frac{2}{5}$ l.

I have ventured to describe this female because I have before me also a male (belonging to Mr. Lea) which however is slightly deformed I think and therefore not suitable to be regarded as a type; its elytra bear some unsymmetrical gibbosities which look as if caused accidentally, probably in the pupal condition. I can say however that it presents all the characters noted above as distinguishing the female from *C. bifossus*, also that the apical dilatation of its front tibiæ is not bisinuate externally.

This species differs from all those mentioned above in the extremely sparse puncturation of its prothorax on which (except near the front and lateral margins) the intervals from puncture to puncture are for the most part about three or four times the diameter of a puncture. It also differs in the base of its prothorax unmargined except close to the hind angles. In the female the space on the apical ventral segment in front of the furrow is almost without punctures. The pygidium of the male example is notably less closely punctulate than that of the female and of *C. bifossus*.

N.S. Wales; taken by Mr. Lea near Forest Reefs.

NOVAPUS.

N. bidentatus, Blackb. In a recent re-examination of the *Dynastides* in my collection I observed with regret that this species is a *Xynedria* and that I was in error in describing it as

a *Novapus*. Moreover I am of opinion that it is not even specifically valid but is simply a very large example, with sexual characters very strongly developed of my *X. interioris*. *N. bidentatus* therefore must be regarded as a synonym of *X. interioris*.

N. crassus, Shp. I have recently examined male specimens from W. Australia (forwarded by Mr. Lea) of what I have no doubt is this insect. It is certainly distinct from all the *Novapi* that I have described, being nearest to *N. Adelaidæ* (from which it differs *inter alia* by its larger size, scutellum strongly and closely punctulate at least in the front of the middle part, and evidently larger and coarser elytral punctures).

ASEMANTUS (gen. nov. *Dynastidarum*).

Mentum ovale, antice minus angustum; maxillæ robustæ 6-dentatæ; mandibula magna superne conspicua ad apicem obtuse (extus nullo modo) dentata; clypeus a fronte vix distinctus antice angustatus ad apicem recurvus, frons media tuberculo crasso brevi armata; antennæ 10-articulatæ flabello modico; prothorax antice sat late minus profunde excavatus, postice fovea magna (hac puncturis sat grossis impressa) instructus; elytra sat convexa, puncturis seriatis geminatim impressa, interstitiis haud vel vix convexis; pedes robusti, tibiis anticis extus tridentatis posterioribus 2-carinatis, tarsorum posticorum articulo basali (præsertim feminæ) extus sat fortiter lobato, tarsorum anticorum maris unguiculis inæqualibus, tibiis posticis ad apicem lobatis ciliatis; stridulationis organa nulla.

This genus is very close to *Semanopterus* but differs from it by the short basal joint of its hind tarsi which is strongly dilated externally at the apex in a kind of lobe (especially in the female) and by the claws of the front tarsi in the male being unequal (one of them is thicker than the other and is abruptly turned back under the claw joint). The sexes present no distinguishing characters on the upper surface; the apical ventral segment is (as in allied genera) widely and feebly emarginate in the male. The only species I can refer to the genus is one which I believe to be *Semanopterus subæqualis*, Hope, but Hope's description is so defective that it is impossible to be very confident of this identification; the description calls the elytra "fere æqualia" but further on refers to them as having "elevated lines;" I presume this means that there are some scarcely elevated spaces on the elytra, and if this is the correct interpretation I have little doubt the insect before me is *S. subæqualis*. It cannot however stand in the same genus as *S. Adelaidæ*, Hope, which that learned author seems to have regarded as the type of his genus

Semanopterus. Although it is difficult to believe that Burmeister could have placed this insect in the genus *Scapanes* I may say that the description of *S. solidus*, Burm., reads much like a description of its female, examples of which not rarely present the peculiar coloring he attributes to *S. solidus.*

A. subæqualis (? Hope). Late subovatus; colore variabilis (nigro-piceus, piceus, vel rufescens); subtus rufo-hirtus; sat nitidus; fortiter convexus; capite transversim sat crebre rugato, tuberculo valido brevi armato; prothorace quam longiori paullo plus quam sesquilatiori, postice quam antice ut 1⅔ ad 1 latiori, antice excavatione sat magna minus profunda (hac intus squamose sat grosse punctulata) et postice excavatione purva ovali (hac intus fortiter punctulata) impresso, lateribus minus rotundatis, subtilissime (antice crebrius, postice sparsim) punctulato, angulis anticis acutis sat productis posticis rotundato-obtusis; scutello basin versus punctulato; elytris subtiliter punctulatis, puncturis ut series 8 geminatim dispositis, interstitiis haud vel vix convexis inter serierum paria ut series (sed confuse sparsim) punctulatis, parte apicali confuse magis fortiter punctulata; pygidio fortiter gibboso.

Maris pygidio longitudinaliter leviter sulcato, sparsim subtiliter ad basin crebre subtilissime) punctulato; segmentis ventralibus (basali et apicalis parte basali crebre rugulosis exceptis) nitidis transversim uniseriatim punctulatis.

Feminæ pygidio grosse squamose ruguloso, fulvo-hirto; segmentis ventralibus (apicali quam cetera magis crebre) squamose sat grosse rugulosis.

Australia; widely distributed.

SEMANOPTERUS.

This genus is placed by M. Lacordaire provisionally among the *Phileurides* on account of the general resemblance of Hope's figure to the appearance of a *Phileurus.* The labial palpi of *Semanopterus* are inserted low down on the sides of the mentum in such fashion that their basal joint is very little visible from above; nevertheless I cannot satisfy myself that the genus ought to be very widely separated from *Cheiroplatys* and its allies. The following characters in combination distinguish *Semanopterus* from the other known Australian *Dynastides*,—viz., Prothorax with two excavations in both sexes, hind tibiæ with apical ciliæ, basal joint of hind tarsi not excessively dilated at apex, club of antennæ not extraordinarily developed in the male, three external teeth on the front tibiæ, one of the two apical spines of the hind tibiæ inserted more or less behind the base of the tarsus, mentum not of the compressed type, head armed with a blunt tubercle in

both sexes, clypeal suture wanting or very faint, sides of clypeus scarcely (or very feebly) sinuous, mandibles visible in repose, labrum not prominent, front marginal furrow of prothorax not angulated hindward in the middle, organs of stridulation wanting; claws of male simple.

The following is a tabulated statement of the distinctive characters of the *Semanopteri* known to me. *S. (Phileurus) subcostatus*, Cast., might be almost any *Semanopterus* but is probably *Adelaidæ*, Hope. *S. subæqualis*, Hope, is probably the insect for which I propose the new generic name *Asemantus*. I have seen no *Semanopterus* that agrees with the description of *S. depressus*, Hope, or *depressiusculus*, Macl. *S. convexiusculus* might possibly be identical with my *S. punctiventris*, but as the brief description of it implies that the hind corners of the prothorax are not excised, I think its identity very improbable.

A. Sides of prothorax not (or scarcely) sinuate nor strongly incurved in front of base.
  B. Pygidium (at any rate near its base) opaque through the presence of fine close strigosity.
    C. Punctures of the pygidium near its apex quite isolated and very sparse ... ... *Adelaidæ*, Hope.
    CC. The whole surface of the pygidium opaque through close strigosity in the female, rather closely and coarsely punctured near apex in the male ... ... *meridianus*, Blackb.
  BB. Pygidium not opaque through close strigosity *longicollis*, Blackb.
AA. Sides of prothorax not or scarcely sinuate, but strongly rounded, and strongly incurved in front of base.
  B. Pygidium pilose.
    C. Sculpture of pygidium concentric in male ... *concentricus*, Blackb.
    CC. Sculpture of pygidium not concentric in male ... ... *angustatus*, Blackb.
  BB. Pygidium not pilose ... ... *minor*, Blackb.
AAA. Hind corners of prothorax (viewed from above) strongly excised.
  B. Hind excavation of prothorax very lightly impressed.
    C. The elytral costæ quite feebly developed.
      D. Punctuation of prothorax much finer and sparser near the hind excavation than on the sides .. .. *carinatus*, Blackb.
      DD. Punctuation of prothorax evenly distributed and comparatively strong ... *persimilis*, Blackb.
    CC. The elytral costæ very elongate and well elevated ... ... *tricostatus*, Blackb.
  BB. Hind excavation of prothorax deep and elongate-foveiform.
    C. Anterior ventral segments not punctured in the middle ... ... *rectangulus*, Blackb.
    CC. Anterior ventral segments punctured in the middle ... ... *distributus*, Blackb.

S. meridianus, sp. nov. Convexus; nitidus; piceus vel rufescens,

subtus fulvo-hirsutus ; capite transversim rugato, tuberculo frontali armato ; prothorace quam longiori fere sesquilatiori, profunde (interrupte vel continenter) canaliculato, sparsius subtilius (in canaliculæ fundo sat crasse squamose) punctulato, lateribus modice arcuatis postice vix sinuatis ; scutello vix distincte punctulato ; elytris tricostatis (sutura costata haud inclusa), costa externa fere obsoleta, interstitiis sat crebre subseriatim punctulatis, parte apicali crebre confuse punctulata.

Maris prothoracis canalicula antice leviter dilatata ; pygidio antice crebre strigoso, postice crebrius sat fortiter punctulato.

Feminæ pygidio toto crebre æqualiter strigoso. Long., $6\frac{1}{2}$—9 l. ; lat., $3\frac{1}{2}$—$4\frac{1}{2}$ l.

This species is very like that which I take to be *S. Adelaidæ*, Hope, differing from it by the external of the three elytral costæ being almost non-existent and by the sculpture of the pygidium. In the male this segment is throughout more roughly sculptured, the basal strigose portion much narrower and the punctures of the apical portion coarser and closer. In the female the entire segment is closely and evenly strigose, while in *S. Adelaidæ* the apical portion is impressed more or less sparsely with isolated punctures on a nitid surface.

Western N.S.W. ; Bindagundra ; sent by Mr. Lea.

S. concentricus, sp. nov. Convexus ; nitidus ; piceus vel rufescens, subtus et in pygidio fulvo-hirsutus ; capite transversim vel fere subconcentrice rugato, tuberculo frontali armato ; prothorace quam longiori sesquilatiori, profunde canaliculato, sparsius subtilius (in canaliculæ fundo sat crasse squamose) punctulato, canalicula ante medium ut excavatio subcircularis (pone medium ut excavatio ovalis angusta) dilatata, lateribus fortiter arcuatis postice vix sinuatis ; scutello fere lævi longitudinaliter subtiliter canaliculato ; elytris tricostatis (sutura costata haud inclusa), costa externa fere obsoleta, interstitiis sparsim plus minusve seriatim punctulatis, parte apicali leviter crebrius punctulata.

Maris prothoracis canaliculæ excavatione antica sat profunda ; pygidio sparsim hirsuto, concentrice rugato, in area centrali parva sat fortiter punctulato.

Feminæ prothoracis canaliculæ excavatione antica minus profunda ; pygidio dense hirsuto, prope basin crebre rugato, in cetera parte crebre æqualiter granuloso-punctulato. Long., 7—$9\frac{1}{2}$ l. ; lat., $3\frac{3}{4}$—5 l.

Differs from *Adelaidæ, meridianus*, and *longicollis* by the more strongly rounded sides of its prothorax which are strongly, but

scarcely sinuously, incurved close to the base. The costæ of the elytra are much like those of *meridianus*, but do not extend so far back and the intervals between them are more finely and less plentifully punctulate. This species is also distinguished from most of its congeners by the pilosity of its pygidium and from nearly all of them by the sculpture of that segment.

W. Australia ; sent to me by Messrs. J. J. Walker and Lea.

S. angustatus, Blackb. This species is certainly rather close to *S concentricus*, but I am convinced it is distinct. The principal difference seems to be that the costæ of its elytra are markedly feebler—in fact almost obsolete ; and that its pygidium is in the male notably less closely (and not concentrically) strigose with a larger and more nitid punctured space in the centre in which the strigosity is much less distinct, while in the female the pygidium is (not closely granulose-punctulate but) confusedly and by no means closely strigose, with an evident intermixture of defined punctures—in fact not much different from the same segment in the male.

S. tricostatus, sp. nov. Convexus ; nitidus ; piceus ; subtus fulvo-hirsutus ; capite strigoso et sat distincte punctulato, tuberculo armato ; prothorace quam longiori plus quam sesquilatiori, pone medium leviter canaliculato, sparsius (ad latera magis crebre) sat distincte punctulato, lateribus sat rotundatis ante basin sinuatis (superne visis profunde excisis apparentibus) ; scutello puncturis nonnullis impresso ; elytris tricostatis (sutura costata haud inclusa), costis (ut *S. Adelaidæ*, Hope) bene elevatis et ad callum subapicalem continuis, interstitiis sat crebre subseriatim punctulatis, partibus lateralibus et apicalibus crebre confuse sed quam interstitia vix minus fortiter punctulatis.

Maris prothoracis canalicula ante medium ut excavatio circularis sat profunda dilatata ; pygidio confertim subconcentrice rugato.

Fem. latet. Long., $7\frac{1}{2}$—$8\frac{1}{2}$ l. ; lat., 4—$4\frac{1}{2}$ l.

This is a very distinct species with strongly sculptured elytra almost exactly like those of the insect that I take to be *S. Adelaidæ*, Hope, but with a prothorax closely resembling the prothorax of *S. carinatus* and *persimilis*. A single male example sent by Mr. Cowley from N. Queensland seems indistinguishable but perhaps the knowledge of the females might reveal differences.

W. Australia ; near Geraldton (Lea), &c.

S. distributus, sp. nov. Convexus ; nitidus ; piceus vel rufescens, subtus fulvo-hirsutus ; capite transversim vel fere subconcentrice rugato, tuberculo armato ; prothorace quam longiori sesquilatiori, profunde canaliculato, sparsius subtilius (in

canaliculæ fundo sat crasse squamose) punctulato, canalicula ante medium ut excavatio variabilis (pone medium ut excavatio ovalis angusta) dilatata, lateribus sat rotundatis ante basin sinuatis (superne visis profunde excisis apparentibus); scutello minus distincte punctulato; elytris tricostatis (sutura costata haud inclusa), costis internis ultra medium distinctis externa fere obsoleta, interstitiis sat crebre subseriatim punctulatis, partibus lateralibus et apicalibus crebre subtiliter confuse punctulatis; segmentis ventralibus anterioribus punctulatis.

Maris prothoracis canaliculæ excavatione antica sat profunda circulari, feminæ minus profunda magis elongata; maris pygidio confertim subconcentrice rugato, feminæ hirsuto crebre sat fortiter punctulato (antice et ad latera sat subtiliter rugato. Long., $7\frac{3}{4}$—9 l.; lat., $4\frac{1}{5}$—$4\frac{2}{3}$ l.

This species is very like *S. rectangulus*, Blackb. It is distinctly larger and more elongate and may be readily distinguished by its anterior ventral segments being quite coarsely squamose-punctulate and its pygidium pilose in the female.

Victoria and N.S. Wales.

PALMERSTONIA.

Under this name I separated the Australian species that had been attributed to *Horonotus*, chiefly on the ground of their females being devoid of prothoracic excavation or tubercle.

P. (Horonotus) variolicollis, Fairm. In Tr. Roy. Soc., S.A., 1895, p. 40, I expressed the opinion that this is likely to be identical with *P. (H.) optata*, Shp. I have received from Mr. Cowley examples of Dr. Sharp's species taken in N. Queensland and with them other examples that may possibly represent a distinct species and may be Fairmaire's very briefly described insect. They differ from typical *optatus* in having the cephalic-horn much shorter and of the form of an erect triangular lamina, and the coarse puncturation of the sides of the prothorax continuous across the base.

P. pusilla, sp. nov. Sat brevis; picea, supra nitida; subtus sat dense fulvo-hirsuta; prothorace grosse ruguloso; elytris vix punctulatis.

Maris capite lamina triangulari verticali armato; prothorace antice retuso; hujus parte retusa (area longitudinali mediana sat alta sparsim punctulata excepta) ut prothoracis superficie cetera crebre grosse rugulosa, haud ultra prothoracem medium extensa, postice tuberculo parvo armata.

Fem. latet. Long., $5\frac{1}{2}$—$6\frac{1}{2}$ l.; lat., $3\frac{1}{5}$—$3\frac{3}{4}$ l.

The males of the *Dynastides* vary to such an infinite extent in their sexual character that I cannot but recognise the possibility

of this pygmy turning out to be an extreme form of *P. optata*, Shp., but among half a dozen typical specimens of the latter I have seen none intermediate. The striking difference between this species and *P. optata* and *variolicollis* is the small size of the excavation of the prothorax (which does not reach back beyond the middle of the segment) its having at the middle of its hind margin only a minute tubercle; and the rough sculpture of the prothorax being continuous over the whole surface except a thinly punctulate area running along the middle of the excavated portion. The examples before me are undoubtedly males.

N. Queensland; sent by Mr. Cowley.

P. Bovilli, Blackb. I have received from Mr. Cowley a specimen taken in N. Queensland which I believe to be the male of this species. It is very large (long., 13½ l.) and differs from *P. optata*, Shp., in its frontal horn being much shorter and resembling a triangular lamina with the apex bent hindward, in its prothorax almost punctureless (there are a few subobsolete punctures in the hind angles), in its prothoracic excavation very wide but only reaching back to the middle of the segment and having three strong pointed tubercles along its hind margin, and in the median opaque stripe on its propygidium occupying nearly the whole width of the segment so that only the extreme margins of the segment are less minutely sculptured.

NEOCAVONUS.

C. bidens, sp. nov. Sat nitidus; piceo-rufus, elytris nigris; subtus fulvo-hirsutus; elytris fortiter punctulato-striatis, striis vix geminatis, interstitiis fere lævibus.

Maris clypeo subverticali fortiter transverso vix manifeste punctulato, antice rotundato, basi fortiter carinato, marginibus fortiter reflexis; prothorace quam longiori sesquilatiori, antice late retuso, in margine anteriori tuberculo magno bifido armato, antice sat crebre subfortiter (postice minus distincte) punctulato; pygidio sat fortiter (antice et ad latera quam in ceteris partibus magis crebre) punctulato.

Fem. a mari differt prothorace æquali, antennarum clava quam ceteri articuli conjuncti paullo breviori, segmento ventrali apicali haud emarginato, tarsis posticis brevibus. Long., 6 l.; lat., 3½ l.

Easily distinguishable from its described congeners by the strongly bifid tubercle on the front margin of its prothorax.

S. Australia.

PIMELOPUS.

The following characters in combination distinguish *Pimelopus* among the Australian *Dynastides*,—viz., clypeus straight on

the sides, its front margin usually somewhat sinuate, its base feebly carinate and furnished in the middle with a feeble tubercle in the male; prothorax without any discal depression or elevation in either sex, usually with a small fovea on either side near the lateral margin and a feeble basal impression on either side of the middle; elytra more or less punctulate-striate, the striæ not geminate; antennal club small in both sexes; mentum evidently though not strongly compressed (considerably more ridge-like, *e.g.*, than in *Cheiroplatys* or *Novapus*), mandibles in repose but little visible; front tibiæ tridentate in both sexes, posterior tibiæ bicarinate; apex of hind tibiæ ciliate, one of its apical spines inserted more or less behind the base of the tarsus; basal joint of hind tarsi short and very widely dilated at apex; claws simple in both sexes. M. Lacordaire asserts that there are organs of stridulation in two rows on the propygidium, but I have not succeeded in finding organs of stridulation in any *Pimelopus* that I have examined.

This genus is near my *Pseudopimelopus* which differs from it by the presence of a strong cephalic horn and a large prothoracic excavation in the male, and by the front claws being unequal in the same sex,—also by the sub-basal carina on the posterior tibiæ (especially the hind pair) being notably feebler and the rows of punctures on the elytra running in pairs.

I have already (Tr. Roy. Soc., 1887, p. 217) stated and given reasons for my opinion that Burmeister (and Lacordaire following his authority) was in error in thinking that the female on which Erichson formed the genus *Pimelopus* appertained to a species whose male exhibited the characters specified above as distinctive of *Pseudopimelopus*. I think there is no reasonable doubt in the matter and that consequently the only true *Pimelopus* described previously to 1887 was the typical species of the genus (unless *P. lævis*, Burm., be another; it is described on a female and almost certainly appertains to some other genus; at any rate is not as a species at all like any species known to me as congeneric with *P. porcellus*, Er.). In 1887 I added two species to the genus, —one of them doubtfully, but subsequent study confirms its place,—and I now have to describe another species of which I took a female some years ago in N.S. Wales and have since received both sexes (taken near Sydney) from Mr. Lea. The following table shows some of the distinctive characters of the species,—which are very closely allied and differ chiefly in the structure of the hind tarsi and the sculpture of the elytra. It is to be noted that as far as my observations go Lacordaire's statement that *Pimelopus* has organs of stridulation is incorrect (it does not appear that that author had seen a true *Pimelopus*), and also that the tubercle on the head of the female mentioned

by Burmeister and Lacordaire is scarcely noticeable; Erichson in characterising the genus did not mention either organs of stridulation or a tubercle on the head. I have before me a fairly long series of a species that is almost certainly *P. porcellus*, Er., with the description of which it agrees well. I described this species (Tr. Roy. Soc., S.A., 1887, p. 220) as "*P. porcellus*, Er. (?)" but subsequently have examined fresh series of it and think there is very little doubt of its being *porcellus*, and shall so consider it until evidence to the contrary turns up.

A. The striæ and rows of punctures well defined to considerably behind the middle of the elytra.
  B. Hind tarsi very short, their third joint scarcely (in the female not) longer than wide ... *crassus*, Blackb.
  BB. Hind tarsi less short, their third joint markedly longer than wide.
    C. Subsutural region of elytra coarsely and rather closely punctured; subsutural striæ strongly impressed in front ... .. *porcellus*, Er.
    CC. Subsutural region of elytra lævigate or nearly so; subsutural striæ very lightly impressed ... ... *sydneyanus*, Blackb.
AA. The striæ and rows of punctures scarcely reach the middle of the elytra ... ... *dubius*, Blackb.

P. sydneyanus, sp. nov. Ovatus; fortiter convexus; sat nitidus; ferrugineus, subtus hirsutus; capite ruguloso, clypeo antice leviter bisinuato; prothorace lævigato; elytris sat fortiter punctulato-striatis, striis longe ultra medium continuis (suturali in nulla parte fortiter impresso), interstitiis fere lævibus; pygidio ad basin crebre punctulato, in cetera parte lævi; tarsis posticis sat brevibus, articulo basali ad apicem extrorsum sat fortiter dilatato, articulo 3° quam latiori sat longiori.

Maris capite vix manifeste tuberculato.

The male is scarcely distinguishable from the female except by the emargination of the apical ventral segment and the greater convexity of its pygidium.

N.S. Wales.

ANEURYSTYPUS.

I characterised this genus in Tr. Roy. Soc., S.A., 1887, on a S. Australian species which I named *A. calvus*. Subsequently I have seen other species some of which I described in Pr. L.S., N.S.W., 1890, and I took the opportunity of writing those descriptions to mention that the generic characters I had drawn from the mouth organs of *A. calvus* did not seem to be truly generic as they were not exactly reproduced in other species that had come under my notice. The examination of still additional species confirms this observation and also shows an apparent difference in the form of the mentum even between individuals of

a species. I suspect however that this is more apparent than real as the mentum when the insect has its mouth open is more prominent than if the mouth be closed; this point could be cleared up only by dissecting a number of conspecific examples, but unfortunately these species are rare and I have not yet received or collected any in sufficient numbers for the purpose. But at any rate within the range of *species* that cannot possibly in my opinion be removed generically from *A. calvus* there is considerable variety in the mouth organs and especially in the mentum, some having the mentum only gently convex (as is the case with *A. calvus*) and others having it quite strongly compressed and even carinate down the middle line; in *A. calvus* the hind part is gently concave down the middle, the concavity however ceasing in the front part which is entirely convex. In *Corynophyllus* (as far as my observations go) the mentum is invariably flat (or at any rate notably less convex than in any *Aneurystypus*) and I think this is a reliable distinction between the genera which (as I have already pointed out) are also distinguishable *inter se* by the form of the antennal club, the joints of which are in *Aneurystypus* narrow elongate and parallel while in *Corynophyllus* the corresponding joints are much wider and are ovate in form. *Teinogenys* must be very near to *Aneurystypus* but no doubt differs as the described species are evidently quite unlike the described *Aneurystypi* as species. I have not an authentic type of *Teinogenys* and therefore do not feel able to speak authoritatively about it though I have little doubt I know it.

The following tabulated statement will show distinctive characters for the six described species of this genus:—

A. Antennal club very long,—more than half again as long as the rest of the joints together.
  B. Front of prothorax armed with a strong tubercle.
    C. Clypeus subvertical ... ... *calvus*, Blackb.
    CC. Clypeus nearly continuous in direction with the rest of the head ... ... *aurilegulus*, Blackb.
  BB. Front of prothorax unarmed.
    C. Clypeal suture carinate, armed with a strong median tubercle ... ... *metallicola*, Blackb.
    CC. Clypeal suture feebly defined, unarmed ... *collaris*, Blackb.
AA. Antennal club much shorter.
  B. Clypeus subvertical, narrow ... ... *dives*, Blackb.
  BB. Clypeus much wider nearly continuing the plane of the rest of the head ... ... *Richardsœ*, Blackb.

A. aurilegulus, sp. nov. Mas. Castaneus; subtus dense longe fulvo-hirsutus; clypeo (hoc subhorizontali) squamose, vertice rugulose, prothorace sparsius minus subtiliter, scutello subtilius inæqualiter, pygidio sparsissime (ad latera sat crebre) punctulatis; elytris punctularum seriebus circiter

10 minus regularibus (his vix geminatis) instructis, interstitiis (ex his nonnullis leviter convexis) punctulatis; antennarum flagello quam articuli ceteri conjuncti fere ut $1\frac{2}{3}$ ad 1 longiori; prothorace excavatione magna (hac fere ad basin extensa) impresso, antice tuberculo armato.

Fem latet. Long., 7 l.; lat., $4\frac{1}{5}$ l.

The clypeus has the usual rounded outline and concave surface and almost continues the plane of the hinder part of the head instead of (as in some species) being sub-vertical. The clypeal suture is only moderately cariniform. The part of the head behind the clypeal suture is remarkably sculptured; from either end of the clypeal suture a strong carina runs sinuously backward and meets its fellow-carina at the back of the head thus enclosing a subtriangular flattened area. The prothoracic excavation is larger than in any other *Aneurystypus* or any *Corynophyllus* known to me. The elytral puncturation is (for this genus) exceptionally plentiful; there are about ten fairly distinct rows of punctures placed (not very noticeably) in pairs, the interstices between the two of a pair being irregularly a little convex and scarcely punctulate, while the others are punctured similarly to the series but somewhat confusedly.

W. Australia; taken by Mr. T. W. G. Blackburn near Coolgardie.

A. dives, sp. nov. Mas. Castaneus; subtus dense longe fulvo-hirsutus; clypeo (hoc subverticali) sparsius, vertice crebrius rugulose, prothorace sparsim subtiliter, scutello vix manifeste, pygidio sparsissime, punctulatis; elytris striis punctulatis; elytris striis punctulatis circiter 6 impressis, interstitiis in disco vix manifeste (parte laterali sparsim sat distincte) punctulatis; antennarum flagello quam articuli ceteri conjuncti fere ut $1\frac{1}{4}$ ad 1 longiori; prothorace excavatione transversa (hac in medio retrorsum anguste producta) leviter impresso, antice tuberculo acuto armato.

Fem. latet. Long., $7\frac{1}{2}$ l.; lat., $4\frac{2}{5}$ l.

At once distinguishable from the preceding species by its subvertical clypeus and the absence of carinæ behind the clypeus, also by the very faintly impressed and smaller excavation of its prothorax, its striate and much less punctulate elytra, the absence of comparatively close puncturation on the sides of the pygidium, &c.

W. Australia; Coolgardie; sent by Mr. Lea.

RHIPIDOCERIDÆ.

CALLIRRHIPIS.

C. cardwellensis, sp. nov. Mas. ? Picea, subrufescens; sat nitida; capite verticali; prothorace quam longiori sesqui

latiori, subtilissime sparsius (antice paullo minus sparsim) punctulato, angulis anticis nullis posticis minutis acutis retrorsum directis, basi fortiter bisinuata; scutello subcirculari fere lævi; elytris subtiliter sat crebre punctulatis et costis 4 vix manifestis instructis; antennarum lamellis in articulis 3°—8° gradatim magis elongatis, in articulis 8°—11° inter se sat æqualibus (his lamellis quam antenna tota circiter triplo brevioribus). Long., 10 l.; lat., $3\frac{1}{2}$ l.

Differs widely from *C. ruficornis*, Gray (the only Australian *Callirrhipis* yet described) by its finely punctured and non striate elytra.

N. Queensland; Cardwell; in the collection of Mr. French.

LONGICORNES.

ANATISIS.

A. Muelleri, sp. nov. Mas. Piceus, elytris pedibusque rufescentibus; pilis (his in capite prothoraceque fulvis maculatim condensatis, in elytris abdomineque albis sparsim dispositis, in metasterni latere niveis dense lineatim condensatis) vestitus; prothorace brevi, grosse vermiculato-ruguloso, ad latera rotundato; scutello dense fulvo-piloso; elytris antice grosse (apicem versus obsolete) punctulatis, apice suturali spiniformi; antennis ut *A. laminosi*, Newm., laminatis. Long., 10 l.; lat., $3\frac{1}{5}$ l.

Differs from *A. laminosus*, Newm., by its evidently shorter and wider form, its prothorax shorter, more rounded on the sides and more coarsely sculptured, its elytra with the sutural apex spiniform, their puncturation coarser, the coloring and arrangement of the pilosity, &c. Dedicated to the late Baron von Mueller.

N. Queensland; in the collection of Mr. French.

PHYTOPHAGA.

OIDES.

O. tigrina, Blackb. In describing this species at p. 81 (Part I.) of the present vol. I accidently omitted to state that it was taken by Mr. Cowley in N. Queensland.

AULACOPHORA.

A. cucullata, Blackb. In describing this species at p. 83 (Part I.) of this present vol. I accidently omitted to state that it was taken in N. Queensland and sent to me by Mr. Masters.

Notes on a Bore at Enfield, near Adelaide.

By Walter Howchin, F.G.S.

[Read December 3, 1895.]

In 1887 Mr. Rake, of Enfield, put down a bore near his homestead with the hope of finding water suitable for his stock at a moderate depth. The bore was continued to a depth of 154 feet, but as only a small flow of brackish water was tapped Mr. Rake was discouraged and stopped the work. I paid several visits to the spot when the works were in progress, and obtained samples of the material at various depths. A hope that Mr. Rake would pursue his investigations further led me to defer publishing the results until now, but as there seems little probability that boring operations will be resumed, I have decided to place the particulars on record.

The site of the bore is on a flat-topped ridge which extends from North Adelaide to Dry Creek. The ridge has an elevation of about 100 feet above the plains of the seaboard on the one side, and the valley of the Torrens on the other. It is thus to some extent isolated, and occupies a higher elevation than the alluvial plains in the vicinity.

Lithological Features.—If we except the first four feet, which was in the ordinary surface travertine of the neighbourhood, the bore can be roughly divided into three portions.

1. An upper series of variously colored clays—blue, grey, red, and mottled with a three feet layer of coarse sand and gravel near the base, the whole reaching a depth of 58 feet.

2. Variously colored sands, mostly very fine, and having a thickness of about 32 feet. The first 6 feet of these sand beds exhibit a wonderful diversity of bright colors in distinct bands —yellow, grey, bright red, pale red, pink, and white follow in descending order, the grains of sand for the most part being uniformly about one-hundredth of an inch in diameter.

Immediately under these highly-colored bands of sand a (?) freshwater limestone, two feet thick, was met with resting on a bed of clay about six feet thick. Below this clay there is a thick bed (18 feet) of yellow and white sand, so extremely fine and uniform in size that it nearly all passes through a two-hundredth of an inch mesh.

3. A series of lower clay beds (separated from the overlying sands by a foot of pipeclay), and reach a thickness of 64 feet. These clays are very compact and even finely laminated, which features distinguish them from the more plastic clays of the upper portions of the bore.

Geological Features.—The beds passed through are apparently of alluvial and lacustrine origin. The thick sand beds with grains of uniform size, as well as the limestone, were probably laid down under lacustrine conditions. The only indisputable evidence of fossil remains was the impression of a spire of a gastropod shell in the limestone, but too indefinite to indicate its generic affinities. The geological horizon of these beds can, therefore, only be surmised from their lithological features. They certainly do not correspond with the Pliocene clays and drifts of the Adelaide Plains. The fine, clean sands, the (?) fresh-water limestone, and the highly indurated condition of the lower clays are points of difference.

In examining some of the material microscopically, I observed small siliceous granules which had to all appearance been formed from colloid silica.

The River Torrens, in passing between North Adelaide and the city, cuts through the ridge referred to at right angles, and exposes the marine Miocenes in its banks. The travertine crust, which is a marked feature of this ridge from North Adelaide to Enfield, probably indicates an extension of the Miocene beds in that direction. Whether they actually extend in a northerly direction as far as the bore now described has been left unfortunately an undecided point, as the bore was not deep enough to settle the question.

The beds passed through in the Enfield bore certainly exhibit some resemblance to the variegated clays and sands of the Miocene beds at Hallett's Cove. It is not unlikely that they represent the eastern fringe of an Upper Miocene formation that once, more or less covered the plains to the westward, but has been removed by the denuding forces that immediately preceded or were coincident with Pliocene times.

[For particulars of the Boring see next page.]

Enfield Bore, Near Adelaide.

TABLE OF STRATA.

No.	Thickness of Bed in Feet.	Depth from Surface.	Description of Bed.
1	4	4	Travertine limestone.
2	21	25	Very stiff bluish-grey clay of uniform features.
3	10	35	Arenaceous red clay. Sand very fine and of uniform size.
4	9	44	Subangular gravel in red clay.
5	10	54	Mottled red and white clay, compact, and of uniform features, passing into dark red sand, the grains one-fiftieth inch in djameter.
6	3	57	Coarse sand and gravel (subangular), chiefly quartz with clay.
7	1	58	Bluish-grey arenaceous clay, streaked with brown.
8	6	64	Thin beds of variegated sands, mostly very fine and clean, as follows :— *(a)* Greyish-yellow sand, half of which passes through a hundredth-of-an-inch mesh—the rest a trifle larger. *(b)* Grey sand, very uniform, nearly all passes through the hundredth-of-an-inch mesh. *(c)* Bright red sand, half passes through the one-hundredth-inch mesh. *(d)* Light red sand, grains of same size as preceding. *(e)* Pink-coloured sand, grains having an average size of one-thirtieth of an inch. *(f)* Very fine white sand in clay cement. *(g)* Coarse gritty, white and grey sand, held together with a small proportion of pipe clay.
9	2	66	White limestone (? fresh-water) with fossil impressions. Residue after solution of Ca CO_3 in H Cl., subangular quartz.
10	2	68	Grey-coloured clay. Residue, after washing, very fine white sand—translucent quartz grains of uniform size.
11	4	72	Yellowish-grey clay of uniform features, and giving a residue, after washing, of very fine sand.
12	10	82	Very fine yellowish sand, of uniform size, two-hundredth of an inch in diameter.
13	2	84	Very fine white sand, of uniform size, two-hundredth of an inch in diameter.
14	6	90	Very fine yellow sand, of uniform size, two-hundredth of an inch in diameter.
15	1	91	Pipe-clay of yellowish-white colour.
16	10	101	Argillaceous grey and yellow sands.
17	1	102	Arenaceous clay of reddish-grey colour.
18	7	109	Yellow tenaceous clay, finely laminated.
19	29	138	Very tough red clay, laminated (? with subangular quartz pebbles).
20	1	139	Cream-coloured, impure pipe-clay. Brackish water, yielding 170 gallons an hour.
21	15	154	Very tough laminated red clay, with stones. When washed, colours water a bright brick-red, leaving a residue of brick-red sand, the grains mostly two-hundredth of an inch in diameter.

[Bore stopped.]

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1895-96.

ORDINARY MEETING, NOVEMBER 5, 1895.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—W. HOWCHIN, F.G.S. exhibited a fragment of a fossil fish from the Eocene beds of the River Murray, near Morgan, collected by the Rev. W. L. Butler, of Renmark. The scales resembled those of a fossil species of *Pagrus* in the University Museum; also a stone marked with straight lines apparently for ceremonial purposes by the Aborigines. J. G. O. TEPPER, F.L.S., showed some fine specimens of *Mylitta australis* from the South-East, and some younger specimens from Mount Lofty. Also a woody fungus from Kangaroo Island. Also a case of Australian *Buprestidæ* of the genus *Stigmodera*. S. DIXON exhibited, with descriptive remarks, a large collection of auriferous and geological specimens from Coolgardie and Kalgoorlie, Western Australia. E. C. STIRLING, M.D., F.R.S., showed a large collection of ceremonial sticks and stones from the McDonnell Ranges, suggesting that they might have to do with marriage rites and food supplies. There were differences in their individual lines, but a general resemblance in the whole. The form of the animal represented by the totems was not approached in the markings.

PAPER.—"Natives of the Peake District," by E. J. KEMPE.

ORDINARY MEETING, DECEMBER 3, 1895.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited a case of *Lepidoptera*. Prof. TATE, F.G.S., laid on the table geological specimens from Victoria Land Antarctic Regions. S. J. SKIPPER exhibited a number of snakes caught by Mr. Willshire in the vicinity of Victoria River, Northern Territory, and presented to the South Australian Museum.

PAPERS.—"On the Origin of the Artesian Water Supply, Lake

Eyre Basin," by Prof. TATE, F.G.S. "Notes on a Bore at Enfield, near Adelaide," by W. HOWCHIN, F.G.S.

ORDINARY MEETING, APRIL 14, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBIT.—Prof. TATE, F.G.S., exhibited on behalf of THOS. SMEATON a specimen of *Helmintha echioides*, a European weed, now recognised for the first time in Australia.

BALLOT.—THOS. E. PARKER, C.E., was elected a fellow.

NOTICES.—Prof. TATE, F.G.S., drew attention of the Fellows and Members to the fact that a Memorial Fund was being raised to perpetuate the memory of the great scientific services rendered by Thomas H. Huxley, F.R.S. The Council of the Society had agreed to act as a General Committee, and E. C. Stirling, M.D., F.R.S., and Prof. R. Tate, F.G.S., F.L.S., as Hon. Secretaries.

W. HOWCHIN, F.G.S., reported that MAURICE HOLTZE, F.L.S., had been requested by the Council to act as its representative on the J. M. MCDOUALL STEWART MEMORIAL COMMITTEE, the idea being to collect one shilling subscriptions for that purpose.

PAPERS.—"Eocene Strata near Bordertown," by E. V. CLARK. "*Microlepidoptera*," by J. JEFFREYS TURNER, M.D. "Contributions to *Coleoptera*," by Rev. THOMAS BLACKBURN, B.A.

ORDINARY MEETING, MAY 5, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—Prof. TATE, F.G.S., exhibited specimens and gave a technical description of a new species of land snail, *Glyptorhagada euglypta*, obtained by the Government Geologist, H. Y. L. BROWN, F.G.S., at Anabama, 75 miles North-East from Kooringa. The nearest ally is *G. Bordaënsis*, inhabiting near Cape Borda, Kangaroo Island, from which it differs by much larger size, relatively deeper, aperture different in outline, the spire slightly elevated, the costæ wider apart and serrated by spiral incisions, and the umbilicus smaller.

W. HOWCHIN, F.G.S., laid on the table a portion of the bore from Murray Flats, near Pine Hut Creek, about a quarter of a mile from the base of the hills. It consisted of earthy limestone carrying fossils of lower Eocene age. Depth 356 feet. J. G. O. Tepper, F.L.S., showed a case of rare and highly colored *Orthoptera*. When at rest they resemble in color their surroundings, in flight their gayer color is seen. MAURICE HOLTZE, F.L.S., exhibited a portion of a willow branch that had grafted itself by its apex into the stem.

BALLOT.—J. W. Jones, Conservator of Water, was elected a Fellow.

PAPERS.—"Correlation of the Marine Tertiaries of Australia, Part II," by Prof. R. TATE, F.G.S., and JOHN DENNANT, F.G.S. "Description of New Land Snail, *Glyptorhagada euglypta*," by Prof. TATE, F.G.S.

ORDINARY MEETING, JUNE 2, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—W. HOWCHIN, F.G.S., showed for Prof. R. TATE, F.G.S., specimens of *Apus Australiensis* (Spencer and Hall) taken from a lake at the Leviathan Battery, Kalgoorlie, W.A., by G. R. TATE. The species resembled *Lepidurus viridis* common in rain pools about Adelaide, but it belongs to a distinct genus which as far as known has only one species in Australia, which was figured and described in 1896 in the Zoology of the Horn Expedition. It had, however, been taken at Arkaringa Valley, S.A., by R. HELMS, of the Elder Exploring Expedition. R. JAGOE forwarded specimens of the moth and cocoon of *Antherea Roylei*, the produce of cocoons taken by some of Dr. Jamieson's party from the Cape Colony.

BALLOT.—THOMAS J. GREENWAY was elected a Fellow.

PAPERS.—"Notes on a Genus of *Gryllidæ*," by J. G. O. TEPPER, F.L.S. "New Australian Lepidoptera," by OSWALD LOWER, F.Ent.S.

ORDINARY MEETING, JULY 7, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

BALLOT—Dr. JAS. H. G. DRUMMOND, Dr. M. VON LUKOWITZ, and E. W. HAWKER were elected Fellows.

PAPER.—"The Artesian Water Supply, Lake Eyre Basin," by J. W. JONES, Conservator of Water.

ORDINARY MEETING, AUGUST 4, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited a nest of *Palistes* of the family *Apidæ* of a very large size, forwarded by Miss ELSIE ROBERTSON, from Chowilla, River Murray. E. C. STIRLING, M.D., F.R.S., and A. ZIETZ, F.L.S., laid on the table the fossil bones of *Genyornis Newtoni* and other fossils and recent struthious birds for comparison.

PAPER.—"Preliminary notes on *Genyornis Newtoni*," a new

genus and species of Fossil Struthious Bird, found at Lake Callabonna, South Australia, by E. C. STIRLING, M.D., F.R.S., and A. ZIETZ, F.L.S.

ANNUAL MEETING, OCTOBER 6, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited a case of *Lepidoptera*, illustrative of the genera *Euphtoea* and *Danais*, from Cachar, India, being part of the collection presented by ALLAN W. CHALMERS to the South Australian Museum. W. HOWCHIN, F.G.S., exhibited a block of silicified wood forwarded by C. H. HUSSEY, from a spot two miles from Port Elliot. It resembles the silicified wood from the Miocene beds at Gawler. He was not aware that these beds were represented near Port Elliot.

ANNUAL REPORT and BALANCE-SHEET were read and adopted.

ELECTION OF COUNCIL.—Walter Howchin, F.G.S., President; Prof. R. Tate, F.G.S., and Rev. Thomas Blackburn, B.A., Vice-Presidents; Walter Rutt, C.E., Hon. Treasurer; W. L. Cleland, M.B., Hon. Secretary; Professor Rennie, D.Sc., E. C. Stirling, M.D., F.R.S., Maurice Holtze, F.L.S., S. Dixon, J. S. Lloyd, and W. H. Selway, Members of Council.

ELECTION OF AUDITOR.—D. J. Adcock was elected Auditor for 1896-97.

PAPERS.—"Descriptions of *Coleoptera*," by Rev. THOMAS BLACKBURN, B.A.; "*Genyornis Newtoni*, Part II.," by E. C. STIRLING, M.D., F.R.S., and A. H. C. ZIETZ, F.L.S.; and "Relation of Plants, Insects, and Birds to One Another," by J. G. O. TEPPER, F.L.S.

ANNUAL REPORT.

The Council has to report that the scientific work of the Society in publishing new and original matter relating to geology, entomology, mollusca, fossil birds, and Australian anthropology has been carried on successfully during the past year. The Council has also much pleasure in reporting that with the monetary assistance of Sir Thomas Elder, the printing and publishing of the third and final portion of the scientific results of the Elder Exploring Expedition has been brought to a satisfactory completion.

During the past year six new Fellows have been elected, three Fellows have resigned, and one Fellow has died. Although Mr. John Wilson, whose death the Council has the melancholy duty to record, never contributed any paper to the Society's Proceedings, yet by his staunch and loyal support of the Society during the past ten years contributed not a little to the successful carrying out of the expensive work which the publication of the Society's Proceedings entails. In this modest and retiring manner Mr. Wilson set an example to all his fellow-colonists who possess any interest in the recording of new scientific facts, which it would be much to the benefit of the Society if they would follow.

The membership of the Society consists of 11 Hon. Fellows, 75 Fellows, 16 Corresponding Members, and 2 Associates.

During the year the question of raising a fund to assist in erecting a suitable memorial to Prof. Huxley was brought before the Council, with the result of the Council forming itself into a Memorial Committee, with Dr. Stirling, C.M.G., F.R.S., and Prof. Tate, F.G.S., as Hon. Secs.

The Council was also represented on the John McDouall Stewart Memorial Committee by one of its members, Mr. M. Holtze, F.L.S., who kindly consented to act.

The President (Mr. W. Howchin, F.G.S.) has also had the arduous work of editing the Society's Proceedings for the current year (1895-96), owing to the necessity for Prof. Tate, F.G.S., paying a visit to Europe. Whilst the Council sympathises with the President on the additional and responsible work which has devolved upon him, yet at the same time it feels that much good will result to the Society from the fact that Prof. Tate will be brought into personal contact with some of the Hon. Fellows of the Society who reside in Europe, and who enjoy a world-wide reputation in their respective Branches of scientific work. The Council has already been advised of some of the results of this intercourse, which will lead to the publishing of valuable papers in the coming year's Proceedings.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
Oct. 1st, 1895.						
To Balance				76	3	0
" Subscriptions—						
Royal Society	69	0	0			
Field Naturalists' Section	15	0	0			
Malacological Section	2	10	0			
				86	10	0
" Grant from Government				81	6	3
" Interest				2	1	7
				£246	0	10

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding (half year) ...	65	6	2			
Illustrating	18	13	0			
Publishing (half year)	3	15	0			
				87	14	2
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery ...				4	12	0
" Grant to Field Naturalists' Section ...				10	0	0
" Balance in Savings Bank, Oct. 1st, 1896				140	14	8
				£246	0	10

Audited and found correct, October 6, 1896.

D. J. ADCOCK, Auditor.

WALTER RUTT, Treasurer.

DONATIONS TO THE LIBRARY

For the Year 1895-6.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

Austria and Germany.

Berlin—Abhandlungen der Königlich Preussischen Meteorologischen Instituts. Ergebnisse der Beobachtungen an den Stationer II. and III., 1895 ; do., 1892.

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Gottingen—Nachrichten von der K. Gesellschaft der Wissenschaften u. d. Georg-August. Universitat, heft 3, 1895 ; heft 1, 2, 1896

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——— Nova Acta der K. Leopold-Carol. Deut. Akad. der Naturforscher, band LXIV., Nos. 1 and 2

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Kiel—Schriften der Naturwissenschaftlichen Vereins für Schleswig-Holstein, band X., heft 1.

Munich—Sitzungberichte der Mathematisch-Physikalischen Classe der K. B. Akad. der Wissenschaften zu Munich, heft 2, 3, 1895 ; heft 1, 2, 1896.

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——— Verhandlungen der K. K. Geologischen Reichenstalt, Nos. 8, 9, 1895 ; Nos 1, 3, 1896.

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——— Royal Society of Queensland, vol. XI., part 2; Stratigraphical Notes on the Georgina Basin (Jack)
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Toronto—Canadian Institute Transactions, vol. IV., part 2.

FRANCE.

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——— Linnean Society, Journal, vol. XXXI., Nos. 212 to 215; Proceedings, 1896.

——— Royal Colonial Institute, Report of Proceedings, vols. XXVI., XXVII.

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Tokio—Asiatic Society, Transactions, vol. XIII.; Supplement.
—— College of Science, University of Japan, vol. VIII., part 2; vol. IX., part 1.
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Geneva—Société de Physique et d' Histoire Naturelle, Comptes Rendus des Séances, vol. XII., 1895.
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SOUTH AFRICA.

Cape Town—Philosophical Society, vol. VIII., part 2.

UNITED STATES AMERICA.

Baltimore—John Hopkins University Studies, series XII., Nos. 8 to 12; series XIII., Nos. 1 to 8; Circulars, vol. XV., Nos. 121 to 126.

——— American Chemical Journal, vol. XVI., Nos. 7 to 8; vol. XVII., Nos. 1 to 7.

Boston—Society Natural History, Proceedings, vol. XXVI., part 4; Memoirs, vol. V., Nos. 1 to 2.

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Chicago—Field Columbian Museum, vol. I., No. 1; Geological series—No. 1, Botanical series; Nos. 1 and 2; Zoological series; No. 1, Anthropological series.

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FROM THE AUTHORS.

Enzio Reuter—Ober die Palpen der Rhopaloceron.
D. Gill, L.L.D.—Report on the Geodetic Survey of South Africa.
W. Horn—Report on the Work of the Horn Expedition to Central Australia, parts I. to IV.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1896.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election

HONORARY FELLOWS.

1857. BARKELEY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., L.L.D., Sydney, New South Wales.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph. D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria. [Since deceased.]
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer New South Wales, Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1880. *KEMPE, REV. J., Australia.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Botanic Gardens, Sydney, New South Wales.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Freemantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS.
1883. *STIRLING, JAMES, Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock, D. J., Adelaide, South Australia.
1874. Angas, J. H., Adelaide, South Australia.
1895. Ashby, Edwin, Adelaide, South Australia.
1887. Bagot, John, Adelaide, South Australia.
1893. *Bednall, W. T., Adelaide, South Australia,
1887. *Blackburn, Rev. Thomas, B.A., Woodville, South Australia.
1884. Boettger, Otto, Adelaide, South Australia.
1886. *Bragg, W. H., M.A., Professor of Mathematics, University of Adelaide, South Australia.
1882. Brown, L. G., Adelaide, South Australia.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., England, Kooringa, South Australia.
1884. Bussell, J. W., F.R M.S., North Adelaide, South Australia.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, South Australia.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide, South Australia.
1895. Cooke, John H., Adelaide, South Australia.
1880. Cox, W. C., Semaphore, South Australia.
1887. *Dixon, Samuel, Adelaide, South Australia.
1876. Dobbie, A. W., Adelaide. South Australia.
1896. Drummond, J. H. G., M.D., Moonta.
1893. Dudley, U.
1890. *East, J. J., F.G.S. (Corresponding Member, 1884.)
1871. Elder, Sir Thomas, G.C.M.G., Adelaide. South Australia.
1886. Fleming, David, Adelaide, South Australia.
1882. Fowler, William, Melton, Yorke's Peninsula, South Australia.
1889. Fraser, J. C., Adelaide, South Australia.
1880. *Goyder, George, Jun., F.C.S, Government Analyst South Australia, Adelaide, South Australia.
1890. Grey, Rev. William, Mount Barker, South Australia.
1887. Grasby, W. C., F.L.S., Adelaide, South Australia.
1896. Greenway, Thomas J., East Adelaide.
1896. Hawker, E. W., Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, South Australia.
1883. *Howchin, Walter, F.G.S., Goodwood East, South Australia.
1893. James, Thomas, M.R.C.S., England, Moonta, South Australia.
1896. Jones. J. W., Conservator of Water, Adelaide.
1853. (F) Kay, Robert, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide, South Australia.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.
1866. Lloyd, J. S., Adelaide, South Australia.
1888. *Lower, O. B., F. Ent. S., Parkside, Unley, South Australia.
1885. *Lucas, R. B., Adelaide, South Australia.
1896. Lukowitz, M. von, M.D., Adelaide.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, South Australia.
1874. Mayo, G. G., C.E., Adelaide, South Australia.

1882. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, South Australia.
1859. (L)Murray, David, Adelaide, South Australia.
1884. Munton, H. S., Brighton, South Australia.
1896. *Parker, Thomas, C.E., Rockhampton, Queensland.
1893. Perks, R. H., M.D., F.R.C.S., England, Birksgate, South Australia.
1883. Phillips, W. H., Adelaide, South Australia.
1886. Poole, W. B., Adelaide, South Australia.
1895. Ramage, Rev. Granville, Norwood, South Australia.
1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1891. Rogers, R. S., M.D., Adelaide, South Australia.
1876. *Rutt, Walter, C.E., Adelaide, South Australia.
1891. Selway, W. H., Jun., Adelaide, South Australia.
1893. Simson, Augustus, Hobart, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, South Australia.
1871. Smith, Robert Barr, Adelaide, South Australia.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Honorary Director South Australian Museum, Adelaide, South Australia.
1893. *Streich, Victor, F.G.S.
1876. *Tate, Ralph, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist South Australian Museum (Corresponding Member, 1878), Adelaide, South Australia.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Joseph, J.P., Adelaide, South Australia.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Adelaide, South Australia.
1883. Wainwright, E. H., B.Sc., St Peter's College, South Australia.
1878. Ware, W. L., Adelaide, South Australia.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Adelaide, South Australia.
1859. Way, Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner, Adelaide, South Australia
1886. *Zietz, A., F.L.S., Assistant Director South Australian Museum, Adelaide, South Australia.

ASSOCIATE.

1895. Cleland, John B., Parkside, South Australia.

APPENDIX.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

THIRTEENTH ANNUAL REPORT

OF THE COMMITTEE, BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1896.

Evening Meetings.—Eight evening meetings have been held during the year, at which the attendance has again been well maintained, the number present being very even throughout the session. It is interesting to note that whereas in the early years of its existence the Section depended almost entirely on its elder members and outside help (such as University Professors and others) for members, &c., younger members are now coming forward for this purpose, with the result that the Section is becoming more self-reliant. The subjects dealt with have been varied and interesting—plants, birds, gold-crystals, and aquaria being some of the topics, while instructive addresses on the structure of feathers and of hair have also been contributed. Exhibits in natural history have formed a prominent feature at these meetings, and the "Question Box" has frequently been utilised as a means of eliciting information on various subjects. Owing to the holding, in October last year, of the Learned Societies' Conversazione, to which members of this Section contributed a large number of exhibits, no similar gathering was held by this Section during the year. Papers, &c., have been given by Dr. Perks, Miss E. F. Haycraft, B.Sc., Messrs. J. G. O. Tepper, F.L.S., T. D. Smeaton, E. Ashby, S. Smeaton, B.A., and W. H. Selway, jun.

Excursions.—Eleven excursions have been held, and the experiment has again been tried of continuing them through the winter months, when the seaside has usually been visited. These coastal trips have not been so much in favour as those to the

hills, some of the latter having been particularly well attended over 40 ladies and gentlemen journeying to the Happy Valley Waterworks and Clarendon. Many of the localities have been visited for the first time by the Section, those specially worthy of mention being the Sandy Creek Scrub and Barossa Goldfields (perhaps the most successful, botanically, during the year) and Echunga, when the gold-bearing features, as well as the plant-life of the locality, was examined. By way of variety, an excursion, chiefly devoted to the study of birds and their habits, was held, and proved very interesting.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose is presented here with.

McDouall Stuart Memorial Fund.—This section appointed a representative on the Committee formed for establishing this fund, and members willingly contributed to the praiseworthy object sought to be carried out by this movement.

Death of Mr. J. Wilson, F.E.I.S.—During the year the Section recorded with regret the death of Mr. J. Wilson, F.E.I.S., who had been a member almost from its inception, and had filled the position of Vice-Chairman.

Financial.—The desire expressed by the parent Society at the beginning of the year for economy in working the Section has been duly regarded. The expenditure has been the smallest on record, and has been considerably exceeded by the amount received in subscriptions.

Membership.—There has been a satisfactory addition of new members to the roll during the year, which counterbalances the loss through resignation and other causes. The number now on the roll is 88.

ROBT. H. PERKS, Chairman.
W. H. SELWAY, JUN., Hon. Sec.

Adelaide, September 18, 1896.

EIGHTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

The Committee has met twice only during the past year. They sincerely regret that the state of Mr. Robin's health has not been such as to enable him to resume the position of Secretary.

Kangaroos.—The Committee having within the last week been informed that the term proclaimed for the protection of kangaroos in the Western District expired 22nd April last, has desired the Secretary to write to the Commissioner of Crown Lands suggesting that the term may be extended.

Destruction of Native Birds' Eggs.—A report has been received from the police stating that at both S. Peters and Norwood all eggs brought in as sparrows' eggs have been carefully examined by the Corporation Officer receiving them to ascertain that there are none of other birds among them.

Shooting Protected Birds During Close Season.—Complaints having been made last year that the reports of guns were frequently to be heard both in the district between Henley Beach and Glenelg, and in the Eastern Suburbs, the Secretary wrote to the Commissioner of Police on the subject. He obtained reports from Glenelg and Norwood that the constables could not obtain sufficient evidence to convict offenders. The Committee are, notwithstanding, aware that the provisions of the Game Act are being constantly broken, and regret that more active steps to prevent such breaches are not taken by the authorities.

The Destruction of Seals.—In their last report the Committee referred to the illegal capture of a seal at Port Vincent. By a letter from the Crown Lands Office, dated 26th September, 1895, they were informed that the seal in question had escaped, and by a subsequent letter that the police had been instructed to strictly enforce the observance of the close season for seals.

The Cape Borda Lighthouse Reserve.—The Committee of the Australasian Association for the Advancement of Science having recommended that this reserve should be dedicated to the preservation of the native fauna, the Secretary wrote to the Commissioner of Crown Lands asking what steps had been taken to carry out this recommendation, and received in reply an intimation that the Marine Board had enquired into the matter, and had carried the following resolution :—"The reserve in question being required as providing a fresh food supply for the Lighthouse-keepers, the Board cannot agree to the suggested dedication."

Again the thanks of the Committee are due to the Commissioner of Crown Lands for the distribution of notices regarding the close seasons for birds and animals.

Samuel Dixon, Chairman.
M. Symonds Clark, Hon. Sec.

September 18, 1896.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1895-6.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.	£	s.	d.
To Balance brought forward	0	14	5	By Postage and Sundries	3	16	3			
" Grant from Royal Society	10	0	0	" Printing	2	8	0			
" Subscriptions	15	0	0	" Attendance	1	0	0			
								7	4	3
				" Subscriptions, as per contra, paid over to Royal Society				15	0	0
				" Balance in hand				3	10	2
	£25	14	5					£25	14	5

Audited and found correct,

THOS. EVANS, F.S.A.I.A.,)
THOS. FABIAN,) Auditors.

Adelaide, 21st September, 1896.

W. H. SELWAY, Jun.,
Hon. Secretary and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

FOURTH ANNUAL REPORT.

In submitting their fourth annual report the Committee are pleased to note signs of the steadily growing interest in those subjects which this society seeks to popularise.

There have been five general meetings of the society during the past year, and five business meetings of the Committee.

The membership numbers forty-five, having gained four and lost two since last annual meeting.

Papers on the following subjects have been read and discussed: —

Computations of time, by Miss A. M. M. Todd.

The effect of the Tides on the Rotation of the Earth, by C. C. Farr, B.Sc.

Hypothesis to Account for Gravitation, by C. C. Farr, B. Sc.

The Theory of the Tides, by R. W. Chapman, M.A.

Jupiter, by E. P. Sells.

Symbols for the Signs of the Zodiac, by Sir C. Todd, K.C.M.G.

Besides the papers the Question Box has provided interesting matter, both for research and discussion.

The Monthly Notes (now in their fifth year) have maintained their character for excellence and have been distributed at the beginning of every month. The thanks of the society are due to the proprietors of the *Register* for publishing the Notes in their paper, thereby increasing the number of those who may be benefitted by them, thus furthering the objects of the society.

Members have been supplied with printed copies of the Rules.

The part taken by the Astronomical Section in the conversazione tendered to His Excellency the Governor last November proved a success, and its best thanks are due to the President and those members who contributed towards that end.

Adopted at annual meeting held at the Adelaide Observatory on the 15th September, 1896.

The following officers were elected for the ensuing year:—Sir C. Todd, K.C.M.G., President; Messrs. Lee and Dobbie, Vice-Presidents; Messrs. Strawbridge, Harris, Kestle, and Griffiths, Committee; and W. E. Cheesman, Honorary Secretary.

C. Todd, President.

W. E. Cheesman. Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Balance Sheet for 1895-6.

Dr.	£	s.	d.	Cr.	£	s.	d.
1895.				By Printing Monthly Notes	2	8	0
To Balance	12	17	7	" Postage	2	10	0
" Subscriptions received	9	15	0	" Stationery	0	18	0
" Interest	0	8	4	" Advertisement	0	3	6
				" Notes Album	0	15	6
				" Printing Rules	1	0	0
				1896.			
				" Balance	15	5	11
	£23	0	11		£23	0	11

Audited and found correct, Sept. 13, 1896.

RICHARD T. GRIFFITHS, Auditor.

W. E. CHEESMAN,
Secretary and Treasurer.

Read and adopted, September 15, 1896.

C. TODD, President.

MALACOLOGICAL SECTION

OF THE

Royal Society of South Australia.

SECOND ANNUAL REPORT.

The section has concluded its work of a critical revision of the Marine Gastropods of South Australia, and have dealt with the following families:—Marginellidæ, Olividæ, Conidæ, Pleurotomidæ, Cancellariidæ, Cypræidæ, and Cassidæ.

The lists of local representations of these families have been considerably increased by the addition of many new species (obtained chiefly through the dredging operations of Dr. Verco), and many forms not hitherto recorded as occurring have been duly localised and identified. Of the former, new species to the number of sixteen belonging to the Pleurotomidæ have been described by Mr. J. B. Sowerby, from type specimens forwarded to him, in a paper in proceedings of the Malacological Society (Vol. II., Part I., April, 1896), and of the other, several have been dealt with by their discoverer, Dr. Verco, in a paper published in this volume of the transactions of the Royal Society of South Australia.

Ten meetings have been held during the year. Dr. R. H. Perks was elected Hon. Secretary and Treasurer vice Mr. R. H. Pulleine, the latter having left Adelaide for residence in Sydney, New South Wales.

Two new members have been elected during the year, Dr. Torr and Mr. Ashby.

MALACOLOGICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Balance Sheet, 1895-6.

Receipts.	£	s.	d.	Payments.	£	s.	d.
To Balance	3	10	0	By Postcards	0	6	0
" Subscriptions	4	0	0	" Caretaker	1	0	0
				" Subscriptions paid to Royal Society	2	10	0
				" Balance	3	14	0
	£7	10	0		£7	10	0

JOS. C. VERCO,
Chairman.

ROBT. H. PERKS,
Hon. Sec. and Treasurer.

GENERAL INDEX.

[The species and genera, the names of which are printed in italics, are described as new.]

Aboriginal ceremonial sticks, 263.
Acrogenius tinctus, 38.
Adimonia *lugens*, 86; *Mastersi*, 87; *Richmondensis*, 87.
Agelastica (Galeruca) melanocephala, 83.
Amphimela australis, 42.
Anatisis *Muelleri*, 259.
Aneurystypus, systematic table of, 257; *aurulegulus*, 257; dives, 258.
Anisogona *placoxantha*, 160.
Antherea Roylei, 265.
Aphthona *Cowleyi*, 76.
Apus Australiensis, 265.
Argobuccinum mimeticus, 221.
Arsipoda, systematic table of, 43; *æneofulva*, 47; *æneescens*, 52; *collaris*, 54; *concolor*, 46; *consanguinea*, 48; *deceptrix*, 50; *detersa*, 49; *fossipennis*, 53; *hepatica*, 54; *jocosa*, 47; *jugularis*, 53; *lœviceps*, 46; *languida*, 46; *laticollis*, 56; *pallidicornis*, 50; *paradoxa*, 51; *picturata*, 55; *podontioides*, 52; *spectabilis*, 48; *striatipennis*, 49; *terminalis*, 51; *variabilis*, 55: variegata, 54.
Asemantus (Dynastidarum), 248; subæqualis, 249.
Aspidomorpha *planipennis*, 107; *lauta*, 108.
Asthena *porphyretica*, 152.
Atychia *anthomera*, 162; *desmotoma*, 162.
Aulacophora *cucullata*, 83, 259; *denticornis*, 83.
Aulacocyclus *errans*, 233; *collaris*, 233.
Birds, Australian Fossil, 176, 191.
Blackburn, Rev. T., on Australian Coleoptera, 35, 233.
Bore at Enfield, 260.
Callirrhipis *cardwellensis*, 258.
Candezea sculpta, 89.
Cassida Adelaidæ, 106; prothoracica, 107.
Cheiloxena *insignis*, 39.
Cheiroplatys, systematic table of, 243; *accedens*, 245; *bifossus*, 243; *compactus*, 246; juvencus, 246; latipes, 245; *pygmæus*, 247.
Chirida *lacunata*, 105; *maxima*, 104; *multicolor*, 103; *simplaria*, 106.
Clark, E. V., Geology of the Ninety-Mile Desert, 110.
Coesyra *chrysocolla*, 29; *dicoela*, 29; *spectabilis*, 28.
Coleoptera, new species of, 35, 233; list of from Lake Callabonna, 212.
Compsotropha *chrysozona*, 27.
Corbula *compressa*, 230.
Corethropalpa falcata, 28.
Crepidodera *crassior*, 67; *indicica*, 67.
Crocanthes *acroxantha*, 170; *epitherma*, 170.
Crypsicharis *pulica*, 164.
Dennant, J., Correlation of Marine Tertiaries 118
Dichelia (?) *amœbœa*, 161.
Doratiphora *euchrysa*, 152; *eumelia*, 153.
Drillia *pentagonalis*, 222; *telescopialis*, 222.
Dynastidarum, see *Asemantus*
Enfield, bore at, 260.
Eochosis, *sarcosma*, 164.
Epipaschia *lithochlora*, 154.
Eulechria *baryptera*, 11; curvilinea, 12; *deltacostamela*, 165; *euchlora*, 12; *stigmatophora*, 11; tetraploa, 13; *tetratherma*, 165; *thermistis*, 166.
Euprionocera geminipuncta, 6.
Euzophera (?) *pyrrhoptera*, 159; *thermochroa*, 160.
Fish (? Pagrus) from Tertiary, R. Murray, 263.
Fossil Wood from Port Elliot, 266.
Galerucides, systematic table of, 39; reviewed, 78.
Gelechia *anthochra*, 168; *deltodes*, 169; hœmaspila, 169; nana, 169; *xanthastis*, 168.
Geology of Ninety-Mile Desert, 110.
Genyornis Newtoni, 171, 191.
Glytorhagada euglypta, 264.
Gracilaria, *pyrigenes*, 1; *ophiodes*, 2.
Haltica, systematic table of, 75; corrusca, 73; ferruginis, 74; *gravida*, 75; *pagana*, 74; splendida, 74.
Halticides, systematic table of, 40.
Halticodes disparipes, 70.
Harpa *punctata*, 218.
Heliocausta *acosmeta*, 4; *achroa*, 4; *complanula*, 4; *phanozona*, 5; *simplex*, 5.
Hoplitica *atripunctatella*, 7; *coxantha*, 7; *porphyraspis*, 8; *pyrites*, 9; *pyrrhella*, 8; *rufimaculella*, 7.
Hormocerus *fossulatus*, 36.
Howchin, W., On a Bore at Enfield, 260.
Hyphaltica Adelaidæ, 73; (?) *anomala*, 71; *lauta*, 71; *mediocris*, 72; (?) *occidentalis*, 72.
Imbricaria *porphyria*, 227.
Isodon, systematic table of, 237; *bidens*, 239; *intermedius*, 241; *lævipennis*, 240; *Meyricki*, 237; *nasutus*, 239; *terræ-reginæ*, 238.
Lake Callabonna, Fossil Bird from, 171, 191; Coleoptera from, 212.
Lepidoptera, New Australian, 152.
Lethocephala (?) *callidesma*, 153.
Linosticha *albida*, 15.
Longitarsus *Victoriensis*, 76.
Lophopepla (Hypercallia) igniferella, 10.
Lower, O., New Australian Lepidoptera, 152.
Macrobathra *chrysobaphes*, 32; *puncticulata*, 32; *rosea*, 33.
Menippus, remarks on, 89.

Mesetia amœna, 37.
Metallarcha *crocanthes*, 157.
Micrantipha *paradoxa*, 89.
Micro-Lepidoptera, Descriptions of, 1.
Mitra *Vincentiana*, 223,
Mollusca, New Species of Marine, 217; New Land Snail, 264.
Momæa *eximia*, 84.
Monolepta, systematic table of, 100; *albotincta*, 99; *biguttigera*, 94; *brevior*, 93; *cognata*, 94; *croceicollis*, 99; *debilis*, 98; *dilutior*, 91; *elytrura*, 93; *eyrensis*, 95; *fumaticornis*, 92; *implicata*, 91; *intertincta*, 96; *melancholica*, 97; *ordinaria*, 97; *pictifrons*, 97; *piticollis*, 98; *sordidulœ*, 96; *sparsipennis*, 92; *subsuturalis*, 95; *tarsalis*, 99; *tricolor*, 95; *variegata*, 94.
Murex umbilicatus, 231.
Myodora *corrugata*, 229.
Myrmecophila *australis*, 149.
Neocavonus *bidens*, 254.
Neorupilia *ornata*, 85.
Nephogenes *variabilis*, 22.
Novapus bidentatus, 247; crassus, 248.
Ninety-mile Desert, Geology of, 110.
Oecophora *hemileuca*, 31; *sphæroides*, 31.
Oenochroa *gnophodes*, 14; *ochrosoma*, 13.
Oides, systematic table of, 82; *ignota*, 80; *insignipennis*, 79; *oculuris*, 80; *plantarum*, 82; *tigrina*, 81, 259; *velata*, 82.
Opisthopygme Jacobyi, 68.
Opsidota *æstuosa*, 37.
Ornix *australis*, 2.
Palmerstonia Bovilli, 254; *pusilla*, 253; variolicollis, 253.
Palparia *euryptera*, 3.
Parocystola leucospora, 30.
Philobota *chrysanthes*, 25; *gonostropha*, 166; *lonchota*, 23; *lunata*, 25; *ocularis*, 26; *orphnæa*, 24; *orphnites*, 24; *perixantha*, 24; *sophia*, 26; *xipheres*, 23.
Phlœopola *basigramma*, 16; *eucapnodes*, 16; *euprepes*, 17; *leucocephala*, 18; *melanospila*, 17; *subviridella*, 15.
Phos tasmanica, 227.
Phyllophanes dyseureta, 21.
Piloprepes *glaucaspis*, 19; *Lucasii*, 19.
Pimelopus, systematic table of, 256; *sydneyanus*, 256.
Placocosma *phœina*, 14.
Plectroscelis, systematic table of, 56; *aciculata*, 63; *alpicola*, 61; *calida*, 59; *crassipennis*, 66; *crebra*, 62; *eyrensis*, 65; *hypocrita*, 63; *impressipennis*, 64; *lindensis*, 61; *longior*, 59; *Meyricki*, 66; *minutalis*, 62; *nozia*, 59; Olliffi, 62; *pallidior*, 65; propinqua 60; *quadraticollis*, 65; *tumbyensis*, 63; *varipes*, 61.
Prasyptera *Mastersi*, 84.
Psylliodes *lubricata*, 78.
Pyenocera hypoxantha, 22.
Queensland, Micro-Lepidoptera of, 1.
Rhizobius secessus, 108.
Rupilia *excelsa*, 85.
Sastra costatipennis, var. *obscuricornis*, 84.
Scoparia *anthomera*, 157; *hypoxantha*, 158.
Semanopterus, classified table of, 250; angustatus, 252; *concentricus*, 251; *distribulus*, 252; *tricostatus*, 252.
Silicified Wood from Port Elliot, 266.
Simæthis *chionodesma*, 167; *ophiosema*, 167.
Solenia Cowleyi, 88.
Sorcostia *niphostena*, 153.
Sphæroderma *baldiensis*, 77.
Spiloscapha thalloides, 36.
Stericta (?) *callizona*, 155; *chionopa*, 155; *leucodesma*, 156; *streptomela*, 156.
Stigmodera *magnifica*, 35.
Stirling, Dr. E. C., on a new fossil Struthious Bird, 171, 191.
Surcula *Perksi*, 224.
Sutrea *Mastersi*, 68; *speciosa*, 69.
Talis *cyclosema*, 158.
Tate, R., Correlation of Marine-Tertiaries, 118.
Telecrates *desmochrysa*, 163.
Tepper, J. G. O., new species of Myrmecophila, 149; Coleoptera of Lake Callabonna, 212.
Teratomorpha coeliota, 20.
Tertiaries of Australia, Correlation of, 118.
Tetrigus *australicus*, 35.
Tortrix (?) *pyrrhopa*, 161.
Triton mimeticus, 221.
Tritonidea *fusiformis*, 219.
Turner, Dr. A. J., descriptions of Micro-Lepidoptera, 1.
Turricula *apicitincta*, 225.
Verco, Dr. J. C., on new species of Marine Mollusca, S. Aus., 217.
Voluta *translucida*, 217.
Xenidia *bizonata*, 43; *melancholica*, 43; *picticornis*, 42.
(?) Xuthea *formosa*, 77.
Xylorycta *candescens*, 163.
Zietz, A. H. C., on a New Fossil Struthious Bird, 171, 191.

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TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XXI.

For 1896-97.

[With Three Plates]

EDITED BY PROFESSOR RALPH TATE.

Adelaide :

W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1897.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

Royal Society of South Australia.

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[Elected October, 1897.]

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Vice-Presidents:

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(Representative Governor.)
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CONTENTS.

PART I. (Issued July, 1897.) PAGE.

COSSMANN, M. : The Opisthobranchs of the Older Tertiary of Australia (plates i. and ii.) 1

MORGAN, DR. M. : List of Birds in the Neighbourhood of Laura, S.A. 22

WAITE, E. R. : Notes on Australian Typhlopidæ (plate iii.) 25

BLACKBURN, REV. T. : Further Notes on Australian Coleoptera ... 28

TATE, PROF. R. : Critical Remarks on some Australian Mollusca ... 40

ERRATUM.

VOL. XX. PLATE II.

The legend "grits, rotten slates," &c., refers to the Archæan ; whilst the area indicated as occupied by those beds is Eocene.

... ... 74

MAIDEN, J. H. : On a New Atriplex from South Australia 87

BLACKBURN, REV. T. : Further Notes on Australian Coleoptera .. 88

Abstract of Proceedings 99

Annual Report 103

Balance-sheet 105

Presidential Address 106

List of Fellows 122

Donations to Library 127

APPENDICES.

Proceedings, Annual Report, and Balance-sheet of the Field Naturalists' Section 130

Annual Report and Balance-sheet of the Astronomical Section .. 135

General Index 137

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CONTENTS.

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COSSMANN, M. : The Opisthobranchs of the Older Tertiary of Australia (plates i. and ii.) 1

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BLACKBURN, REV. T. : Further Notes on Australian Coleoptera ... 28

TATE, PROF. R. : Critical Remarks on some Australian Mollusca ... 40

LOWER, OSWALD B. : Description of new Australian Lepidoptera ... 50

DAVID, PROF. T. W. E., AND W. HOWCHIN : Notes on the Glacial Features of the Inman Valley 61

TATE, PROF. R. : Evidences of Glaciation in Central Australia .. 68

PART II. (Issued December, 1897.)

TATE, PROF. R. : A List of Plants collected by the Calvert Expedition 69

BROWNE, J. HARRIS : Anthropological Notes relating to the Aborigines of the Lower North of South Australia 72

HOWCHIN, WALTER : On the Occurrence of Lower Cambrian Fossils in the Mount Lofty Ranges 74

MAIDEN, J. H. : On a New Atriplex from South Australia 87

BLACKBURN, REV. T. : Further Notes on Australian Coleoptera .. 88

Abstract of Proceedings 99

Annual Report 103

Balance-sheet 105

Presidential Address 106

List of Fellows 122

Donations to Library 127

APPENDICES.

Proceedings, Annual Report, and Balance-sheet of the Field Naturalists' Section 130

Annual Report and Balance-sheet of the Astronomical Section .. 135

General Index 137

The Gasteropods of the Older Tertiary of Australia—Les Opisthobranches.

By Maurice Cossmann, Hon. Fellow.

[Read April 6, 1897.]

Plates I., II.

[Preface.—The examples of fossil-species which form the subject of this memoir were presented to the author by me, but a duplicate set is placed in the Museum of the University of Adelaide. The locality-names quoted by M. Cossmann are those which accompanied his specimens, but I have added to the list as fully as records in the University Museum allow of.—R. Tate.]

Actæon scrobiculatus, *Ten.-Woods.* Pl. i., fig. 1-3.

Référence.—Proc. Roy. Soc. Tasmania for 1876, p. 102 (1877).

Taille petite ; forme ovale, plus ou moins ventrue ; spire courte, à galbe conoïdal ; embryon peu saillant ; cinq tours peu convexes, dont la hauteur est inférieure à la moitié de la largeur, séparés par des sutures peu profondes, ornés de quatre sillons spiraux, cloisonnés par de fines lamelles d'accroissement. Dernier tour presque égal aux quatre cinquièmes de la longueur totale, ovoïde, régulièrement orné comme la spire jusque sur la base, qui est étroitement subperforée dans la région ombilicale. Ouverture étroite en arrière, dilatée en avant où elle est arrondie et légèrement versante ; labre assez épais, très arqué, un peu échancré au dessus de la suture ; columelle coudée par un pli oblique et à peine saillant ; bord columellaire large, calleux, un peu détaché de la base.

Dimensions.—Longueur, 8 mill. ; diamètre, 3·75 mill.

Localités.—Eocene : Table Cape, Tasmania ; Spring Creek, near Geelong, Victoria.

Néotypes.—Pl. i., figs. 1-3 ; deux échantillons ventras de Table Cape, un échantillon plus étroit de Spring Creek. Ma collection.

Affinités.—Cette espèce se rapproche par son ornementation de *Act. subinflatus*, d'Orb., du calcaire grossier parisien ; mais elle en diffère par sa spire plus courte, par ses tours plus étroits et moins convexes, par sa perforation ombilicale, par son pli moins saillant. Si on la compare à *Act. electus*, Desh., du Suessonien des environs de Paris, elle a la spire plus courte, les tours moins élevés, le labre plus arqué, la columelle plus coudée. Enfin, quand on la rapproche de *Act. inflatior*, Meyer, de Claiborne, on

remarque qu'elle est moins globuleuse, que sa spire est plus conoide, que son embryon est moins saillant, que son labre est plus sinueux en arrière, et que son pli columellaire est moins anguleux.

Actæon funiculifer, *nov. sp.* Pl. i., fig. 4, 5.

Taille petite ; forme ovale et globuleuse ; spire très courte, à galbe conique ; embryon à nucléus extrêmement petit, à peine dévié ; cinq tours très étroits, presque plans, séparés par des sutures étroitement canaliculées, ornés de trois rainures spirales et cloisonnées par de fines lamelles d'accroissement. Dernier tour égal ou supérieur aux quatre cinquièmes de la longueur totale, plus large en arrière qu'au milieu, ovalement atténué à la base, orné de rainures cloisonnées inégales et inéquidistantes, celles du bas plus larges que les rubans qui les séparent, celles de la base plus serrées et séparées par des cordons arrondis aussi larges qu'elles. Ouverture médiocrement rétrécie en arrière, dilatée et versante en avant ; labre arqué, non échancré en arrière ; columelle courte, presque dans le prolongement de la base de l'avant-dernier tour, munie d'un pli saillant, transverse et placé très bas qui forme un gradin peu élevé ; bord columellaire calleux, recouvrant la fente ombilicale.

Dimensions.—Longueur, 8 mill.; diamètre, 4·25 mill.

Localité et type.—Muddy Creek (pl. i., fig. 4, 5), ma collection. Miocene, Victoria.

Affinités.—Quoique cette espèce ait beaucoup de ressemblance avec *Act. scrobiculatus*, T. Woods, elle mérite d'un être séparée à cause de sa spire plus courte, de ses tours plus étroits, de ses sutures canaliculées, de ses sillons plus largement rainurés, de son pli columellaire plus saillant et moins élevé, de l'absence de perforation sous le bord columellaire. Elle est presque aussi ventrue que *Act. inflatior*, Meyer, de Claiborne ; mais elle a une spire plus courte, la convexité maximum de son dernier tour est située plus en arrière, son pli columellaire est plus saillant et moins arrondi, enfin ses rainures spirales sont plus larges.

Actæon subscalatus, *nov. sp.* Pl. i., fig. 8, 9.

Taille très petite ; forme globuleuse, subsphérique ; spire courte, étagée en gradins, à galbe conoïdal ; embryon très petit, à nucléus dévié perpendiculairement ; quatre tours très convexes, dont la hauteur atteint le tiers de la largeur, séparés par des sutures peu profondes, étagés en arrière par une rampe arrondie, ornés de cinq sillons spiraux et cloisonnés par de fines lamelles d'accroissement. Dernier tour égal aux trois quarts de la longueur, ventru, subanguleux en arrière, ovalement arrondi à la base, régulièrement orné de sillons étroits et finement cloisonnés, qui sont plus profonds et plus serrés sur la base imperforée. Ouverture courte et

assez large, à peine versante en avant ; labre presque rectiligne et vertical, lacinié sur son contour par l'extrémité des sillons spiraux ; columelle munie d'un pli oblique et peu saillant ; bord columellaire étroit et peu calleux.

Dimensions.—Longueur, 4·5 mill.; diamètre, 3 mill.

Localités et type.—Aldinga (Pl. i., fig. 8, 9), ma collection ; Adelaide-bore.—Eocene, Austr. Sud.

Affinités.—Il n'est pas possible de confondre cette espèce avec les précédentes; outre qu'elle est beaucoup plus globuleuse et plus courte, ses tours sont plus étagés, et son pli columellaire est plus oblique, enfin son labre est presque droit. Elle a un peu la forme de *Semiactæon sphæriculus* du bassin de Paris, mais elle n'appartient pas au même sous genre à cause de son pli épais et de l'absence de fente ombilicale ; de plus, ses sillons sont plus cloisonnés.

Actæon distinguendus, *nov. sp.* Pl. i., figs. 6, 7.

Taille petite ; forme ovale, trapue ; spire courte, à galbe conique ; embryon gros, à nucléus obliquement dévié ; cinq tours à peine convexes, dont la hauteur est inférieure au tiers de la largeur, séparés par des sutures étroitement canaliculées, étagés par une rampe obliquement déclive et plus ou moins visible au dessus de la suture, ornés d'un seul sillon spiral et ponctué sur cette rampe inférieure. Dernier tour un peu cylindrique au milieu, ovale à la base, subanguleux à la limite de la rampe déclive en arrière, orné de sillons spiraux et ponctués très écartés, entre lesquels il y a une strie plus obsolète; sur la base, les sillons sont plus profonds et plus rapprochés. Ouverture égale aux deux tiers de la longueur totale, très étroite en arrière, arrondie et versante à la base ; labre assez mince, arqué, un peu sinueux en arrière ; columelle faisant un angle de 100° avec la base de l'avant-dernier tour, munie d'un pli épais, saillant et arrondi ; bord columellaire large et calleux, recouvrant complètement la fente ombilicale.

Dimensions.—Longueur, 7 mill. ; diamètre, 2·5 mill.

Localités et type.—Eocene : Muddy Creek (Pl. i., figs. 6, 7), ma collection ; Cheltenham near Melbourne ; River Murray Cliffs.

Affinités.—Cette espèce ressemble à *Act. Deshayesi*, de Rainc., du calcaire grossier parisien, à cause de son ornementation et de sa rampe déclive ; mais elle est beaucoup moins globuleuse, sa spire est plus allongée, ses sutures sont plus canaliculées et son pli columellaire est plus saillant. On peut encore la comparer à *Act. lineatus*, Lea, de Claiborne, qui a aussi des sillons écartés ; mais elle s'en distingue par son unique sillon sur chaque tour de spire, par sa rampe plus déclive, par son ouverture plus étroite et par son pli plus saillant.

Actæon evanescens, *nov. sp.* Pl. i., fig. 10, 11.

Taille assez petite ; forme ovale, trapue ; spire courte, un peu étagée, à galbe conique ; embryon à nucléus globuleux et dévié ; quatre tours un peu convexes, dont la hauteur atteint à peine le tiers de la largeur, séparés par des sutures canaliculées et formant un étroit gradin, lisses et brillants, sont un seul sillon spiral au dessus de la suture. Dernier tour presque supérieur aux trois quarts de la longueur totale, régulièrement ovale, arrondi à la base qui est étroitement perforée, orné d'un profond sillon et d'une légére strie au dessus de la suture puis une large zone lisse, au milieu cinq sillons spiraux et ponctués avec une légère strie intercalaire, enfin sur la base une douzaine de sillons plus rapprochés et plus profonds, sans stries dans l'intervalle. Ouverture grande et large, peu versante en avant ; labre à peu près rectiligne et vertical; columelle faisant un angle de 120° avec la base de l'avant-dernier tour, munie d'un pli oblique, assez large et peu saillant ; bord columellaire mince, détaché en avant de la fente ombilicale.

Dimensions.—Longueur, 5·25 mill.; diamètre, 2·75 mill.

Localités et type.—Adelaide-bore (Pl. i., figs. 10, 11), ma collection ; Aldinga.—Eocene, Austr. Sud.

Affinités.—Cette espèce se rapproche, par son ornementation et sa bande lisse, d'*Act. Loustaui*, Desh., du calcaire grossier parisien ; mais elle n'a pas la rampe déclive et les tours subanguleux de cette coquille. Si on la compare à *Act. procerus*, Desh., du Suessonien, qui a aussi une bande lisse sur le dernier tour, elle en diffère par sa forme beaucoup plus trapue, et d'ailleurs elle n'appartient pas au même groupe, puisque son pli columellaire est simple.

Actæon olivellæformis, *Tate.* Pl. i., figs. 12, 13.

Synonymie.—Actæopyramis olivellæformis, Tate, 1893.

Référence.—Journ. Roy. Soc. N.S.W. vol. XXVII., p. 181, pl. xi., fig. 2.

Taille assez petite ; forme étroite, pyramidelloïde ; spire allongée, à galbe conique ; embryon à nuclèus obtus et dévié ; huit tours à peine convexe, dont la hauteur atteint ou dépasse les trois quarts de la largeur, séparés par des sutures étroitement canaliculées, à peu près lisses, avec de très fines stries spirales écartées ou peu visibles et un seul sillon situé près de la suture supérieure. Dernier tour embrassant, égal à la moitié de la longueur totale chez les individus adultes, étroitement ovale, presque lisse comme la spire, sauf à la partie antérieure où il existe 9 sillons écartés, et sur la base imperforée qui porte encore 6 stries plus serrées. Ouverture courte, subrhomboïdale, arrondie du côté antérieur ; labre très mince, peu arqué et peu sinueux en arriére ; columelle coudée, faisant un angle de 100°

avec la base de l'avant-dernier tour munie d'un pli sans saillie qui forme le coude ; bord columellaire mince et bifide sur la région du pli.

Dimensions.—Longueur, 8·25 mill. ; diamètre, 2·5 mill.

Localités. — Muddy Creek, Spring Creek near Geelong.— Eocene.

Nèotype.—Muddy Creek (Pl. i., figs. 12, 13), ma collection.

Observations.—Cette espèce a été décrite par M. Tate dans le genre *Actæopyramis*, institué par Fischer pour corriger le double emploi *Monoptygma* (Gray, *non* Lea) ; je ne crois pas qu'elle appartienne à ce genre qui ne comprend que des coquilles de *Pyramidellidæ*, tandis qu'*Act. olivellæformis* a les tours embrassants et l'embryon des *Actæonidæ ;* d'ailleurs on trouve déjà l'indice de son pli bifide dans les *Actæon* du groupe d'*A. Gmelini ;* elle ne s'en distingue que par sa forme plus allongée et à demi lisse, comme les *Crenilabium ;* toutefois elle n'a pas les crénelures columellaires de ce dernier genre, et son pli coudé est tout à fait différent.

Semiactæon microplocus, *nov. sp.* Pl. i., figs. 14, 15.

Taille assez petite ; forme ovale ; spire courte ; embryon obtus, à nucléus empâté dans la spire ; quatre tours peu convexes, dont la hauteur égale le tiers de la largeur, séparés par des sutures étroitement canaliculées, ornés en avant de trois stries spirales obsolètes, et au dessous d'un intervalle lisse un peu plus large, d'un sillon peu profond, plus rapproché de la suture. Dernier tour égal aux trois quarts de la hauteur totale, ovale, arrondie à la base qui est perforée d'une étroite fente ombilicale, orné sur toute sa surface (sauf un etroit espace lisse au dessus du sillon sutural), de stries spirales et finement ponctués, plus serrées et plus profondes autour de la région ombilicale. Ouverture courte et large, arrondie et peu versante du côté antérieur ; labre un peu oblique et subsinueux, épaissi à l'intérieur ; continuelle droite et inclinée, faisant un angle de 130° avec la base de l'avant-dernier tour, portant au milieu un pli arrondi et peu saillant ; bord columellaire détaché de la base, se raccordant au contour supérieur de l'ouverture.

Dimensions.—Longueur, 6·5 mill.; diamètre, 4·75 mill.

Localités et type.—River Murray Cliffs (Pl. i., figs. 14, 15), ma collection ; Mornington (Port Phillip Bay).—Eocene.

Affinités.—Cette coquille s'écarte des *Actæon* par la petitesse de son pli columellaire ; pour ce motif, je la place dans le sous-genre *Semiactæon* que j'ai proposée, en 1889, pour *S. sphæriculus*, Desh.,

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Actæon puteolata, Pritchard, Roy. Soc. Victoria, vol. VIII., p. 124, t. 4, figs. 10-12, 1896, a fossil from Table Cape, is considered by MM. Cossmann and Tate to belong to *Odontostomia*.

du calcaire grossier parisien ; mais l'espèce australienne se distingue de celle ci par sa taille plus grande, par ses sillons beaucoup moins profonds, par son ombilic moins ouvert et par son pli plus saillant. Si on la compare à *S. Bezançoni*, de la Loire inférieure, on remarque que ses sillons sont moins profonds, moins réguliers, et que son ouverture est plus large, plus évasée en avant.

Triploca ligata, *Tate.* Pl. i., figs. 16, 17.

Référence.—Journ. Roy. Soc., N.S.W., vol. XXVII., 1893, p. 186, pl. xi., fig. 7.

Forme ovoïdo-conique ; spire un peu étagée et allongée, à galbe conique ; embryon peu développé, à nucléus obtus ; cinq tours peu convexes, séparés par des sutures canaliculées, avec un étroit gradin accompagné d'un profond sillon spiral, ornés de fines stries imperceptiblement ponctuées. Dernier tour égal aux deux tiers de la longueur totale, arrondi à la base qui est étroitement perforée, orné sur toute sa surface de fines stries spirales, outre le sillon voisin de la suture. Ouverture courte, ovale en avant et légèrement échancrée sur le contour supérieur ; labre mince, peu arqué ; columelle munie de trois plis lamelleux et saillants, les deux antérieurs plus rapprochés et presque confondus ou un suel pli bifide ; bord columellaire non calleux.

Dimensions.—Longueur, 8 mill.; diamétre, 4 mill.

Localités et néotype.—Adelaide-bore (Pl. i., figs. 16, 17), ma collection ; Cape Otway.—EOCENE.

Observations.—J'ai placé *Triploca* (Essais de Pal. Comp. I., 1895, p. 50, pl. vii., fig. 19) comme sous-genre de *Tornatellœa*, parce que ses plis columellaires ont la même apparence et que le contour basal de l'ouverture est subéchancré ; ce rapprochement est d'autant plus justifié, que les deux plis antérieurs ont une tendance à se confondre l'un avec l'autre, de manière à présenter l'apparence d'un seul pli dédoublé. D'ailleurs *Triploca* s'écarte des *Ringinella*, qui ont aussi trois plis columellaires et un galbe presque identique, par son labre mince ou peu épais, non bordé par un bourrelet externe. On ne connait jusqu'à présent, que cette seule espèce type representant cet intéressant sous-genre.

Tornatina pachyptycha, *nov. sp.* Pl. i., figs. 20, 21.

Taille petite ; forme cylindrique ; spire très courte, étagée en gradins ; embryon assez gros, a nucléus translucide, globuleux et obliquement dévié ; quatre tours plans, extrêmement étroits, munis en arrière d'une rampe déclive, excavée et limitée par un angle un peu saillant, ornés de petits plis d'accroissement obliques sur la rampe. Dernier tour supérieur aux trois quarts de la hauteur totale, à galbe cylindracé, un peu ovalisé en arrière et à la base qui porte, sur la région ombilicale, une dépression im-

perforée et limitée par un angle émoussé ; surface entiérement lisse, sauf les stries d'accroissement. Ouverture longue, étroite, à bords parallèles en arrière, dilatée, versante et obliquement tronquée à la base ; labre mince, oblique, arqué, sinueux prés de la rampe suturale ; columelle courte, excavée, se raccordant avec la base de l'avant-dernier tour par une courbe en *S.*, munie d'un gros pli oblique et peu saillant ; bord columellaire large, mince en arrière, calleux en avant, rejoignant le contour supérieur par une courbe largement ouverte.

Dimensions.—Longueur, 6·25 mill. ; diamètre, 2·75 mill.

Localité et type.—Muddy Creek (Pl. i., figs. 20, 21), ma collection ; MIOCENE : Victoria.

Affinités—On ne peut confondre cette espèce avec *E. crassiplica*, Conr., du Vicksburgien des Etats Unis, qui a une spire encore plus courte et sans gradins, dont le pli est plus anguleux, dont la forme est plus trapue et dont le galbe est plus arrondi en arrière. Si on la rapproche de *E. grignonensis*, Desh., du calcaire grossier parisien, on remarque qu'elle s'en distingue par sa spire étagée et par sa forme cylindracée, par sa dépression ombilicale.

Tornatina longispira, *nov. sp.* Pl. i., figs. 18, 19.

Taille petite ; forme cylindrique ; spire un peu allongée, étagée en gradins ; embryon saillant à nucléus globuleux et translucide ; quatre tours dont la hauteur atteint ou dépasse le tiers de la largeur, plans et lisses, munis en arrière d'une rampe assez large et taillée à angle droit. Dernier tour égal aux trois quarts de la longueur totale, cylindracé, ovale à la base qui porte une petite rainure, imperforée à la place de l'ombilic ; surface entiérement lisse, sur laquelle on ne distingue même pas les stries d'accroissement. Ouverture a bords non parallèles, étroite en arrière, un peu plus dilatée en avant où elle est obliquement tronquée ; labre mince, arqué, peu sinueux en arrière ; columelle oblique, peu incurvée, renflée au milieu par un pli épais, à peine saillant ; bord columellaire large, calleux, recouvrant la région ombilicale.

Dimensions.—Longueur, 7·25 mill. ; diamètre, 2·5 mill.

Localité et type.—Muddy Creek (Pl. i., figs. 18, 19), ma collection.—MIOCENE, Victoria.

Affinités.—Cette coquille n'est peut être qu 'une variété de l'espèce précedente, *T. pachyptycha ;* cependant les trois échantillons que je posséde me paraissent distincts de cette dernière, par leur forme plus étroite, par leur spire plus allongée, par leurs tours plus élevés, par leur rampe moins déclive, par leur pli plus obsolète, par leur columelle moins incurvée. Il est possible que si l'on recueille une série de nombreux échantillons de *Tornatina* du gisement de Muddy Creek, on pouvra trouver des individus in-

termédiaires entre ces deux espèces; mais provisoirement, je crois qu'on peut admettre *T. longispira* comme une espèce distincte.

Tornatina aptycha, *nov. sp.* Pl. i,, figs. 22, 23.

Taille assez petite; forme cylindrique, étroite; spire très courte, un peu étagée en gradins; embryon très saillant, à nucléus dévié en forme de crosse; quatre tours extrêmement étroits, convexes ou subanguleux, avec une rampe déclive au dessus de la suture. Dernier tour égal aux cinq sixièmes de la hauteur totale, cylindracé, ovale à la base qui est imperforée et munie d'une dépression ombilicale très obsolète; surface entièrement lisse. Ouverture très étroite en arrière, à peine dilatée en avant, où elle est découverte et un peu versante; labre peu épais, presque vertical, renversé à gauche de l'axe du côté antérieur, à peine échancré sur la rampe suturale; columelle dans le prolongement de la base de l'avant-dernier tour, absolument dénuée de pli; bord columellaire calleux, recouvrant presque entièrement la dépression ombilicale, et se raccordant avec le contour supérieur de l'ouverture.

Dimensions.—Longueur, 6·5 mill.; diamètre, 2·25 mill.

Localités et type.—Muddy Creek (Pl. i., fig. 22, 23), ma collection; Table Cape.—Eocene, Victoria et Tasmania.

Affinités.—Malgré la resemblance exterieure de cette *Tornatina* cylindrique avec les deux autres espèces déjà décrites, il est impossible de la confondre avec celles, à cause de l'absence compléte de pli columellaire; en outre, elle est plus cylindrique que *T. pachyptycha* et elle n'a pas la rampe de *T. longispira* ni la spire aussi allongée. L'existence simultanie de ces trois formes, qui appartiennent évidemment au même genre *Tornatina*, démontre qu'il ne faut pas attacher l'importance d'un caractere générique à la présence ou à l'absence d'un pli à la columelle, et qu'il n'y a pas lieu de se fonder sur ce pli pour distinguer *Tornatina* de *Retusa*.

Volvulella Tatei, *nov. sp.* Pl. i., figs. 26, 27.

Taille petite; forme fusoïde, acuminée au sommet, ovale à la base; spire involvée et imperforée. Dernier tour embrassant toute la coquille, à galbe ovale et étroit, à surface lisse en apparence mais couverte de fines stries spirales, qui deviennent plus écartées et plus visibles sur la base. Ouverture presque lineaire en arrière, un peu dilatée et découverte en avant; labre très mince, peu arqué, vertical, formant en arrière un bec aigu qui dépasse le sommet d'un demi millimétre; columelle droite,

Tenison-Woods in Proc. Linn. Soc. N.S.W., 1878, figures an Opisthobranch, t. 21, f. 4, as *Tornatina involuta*, which is quite inadequate for generic determination, and is unaccompanied with a description. It may represent a *Volvulella*.

faiblement tordue sur elle même. Bord columellaire étroit, détaché de la base et découvant une étroite fente ombilicale.

Dimensions.—Longueur, 5 mill. ; diamètre, 1·75 mill.

Localité et type.—Muddy Creek (pl. i., fig. 26, 27), ma collection.—Miocene, Victoria.

Affinités.—Cette espèce est plus étroite que *V. redacta*, Desh., du calcaire grossier des environs de Paris, et elle s'en distingue en outre par ses stries et par sa perforation ombilicale ; elle est beaucoup moins étranglée en arrière et moins profondément sillonnée que *V. lanceolata* Sow., de Barton ; si on la compare à *V. DéKayi*, Lea, de Claiborne, on trouve qu'elle est bien moins conique, que son pli columellaire est moins saillant, et que son labre dépasse moins le sommet ; *V. Meyeri*, Cossm., de Jackson (Mississipi) est beaucoup plus ventrue et a un pli bien plus saillant ; elle ressemble plutôt à *V. radius*, Desh., du Suessonien, mais elle est plus étroite et plus allongée, plus visiblement striée. En résumé, quoique le nombre des *Volvulella* éocéniques est déjà grand, je la crois différente de celles qui sont anterieurement décrites.

Volvulella inflatior, *nov. sp.* Pl. i., fig. 24, 25.

Taille microscopique ; forme régulierement ovale, étroite ; dernier tour embrassant toute la coquille, entièrement lisse, imperforé au sommet et à la base. Ouverture lineaire en arrière, subitement dilatée en avant ; labre mince, à peu prés vertical ; un fort pli columellaire, se raccordantpar une courbe arrondie et carénée avec le contour supérieur, qui découvre largement l'ouverture.

Dimensions.—Longueur, 2·25 mill.; diamètre, 1·25 mill.

Localités et type.—Spring Creek (Pl. i., fig. 24, 25), ma collection ; Table Cape.—Eocene, Victoria et Tasmania.

Affinités.—Quoique je ne posséde qu'un seul échantillon extramement petit, je n'hésite pas à séparer cette espèce de *V. Tatei*, qui est beaucoup plus allongé et plus étroit ; en outre *V. inflatior* a un pli plus saillant à la columelle et son labre ne dépasse pas le sommet de la coquille. Si on compare *V. inflatior* à *V. redacta* du bassin de Paris, on trouve que cette dernière espèce est moins ovale et plus acuminée au sommet, que son ouverture est moins rétrécie en arrière et qui sa base est perforée ; si on la rapproche de *V. radius*, Desh., du Suessonien, on remarque que l'espèce australienne a l'extremite inférieure plus arrondie, et que son ouverture est plus étroite en arrière, plus dilatée et plus découverte en avant.

Scaphander Tatei, *nov. sp.* Pl. i., figs. 34, 35.

Taille moyenne ; test très mince ; forme ovoido-conique ; spire largement perforée au sommet qui est creusé d'un petit entonnoir

arrondi. Dernier tour embrassant toute la coquille, ventru au milieu, obliquement atténué du côté posterieur, largement dilaté et ovalement arrondi du côté anterieur ; surface régulièrement ornée de profonds sillons finement ponctués par les accroissements, et dont les intervalles portent quelquefois, surtout en arrière, une strie intermédiaire plus fine. Ouverture grande et découverte, rapidement dilatée ; labre régulièrement arqué ; bord columellaire mince, largement étalé.

Dimensions.—Longueur, 15 mill.; diamètre, 8 mill.

Localités et type.—Muddy Creek (Pl. i., fig. 34, 35), ma collection ; Mornington, River Murray Cliffs.—Eocene, Austr. Sud., Victoria.

Affinités.—Cette fragile espèce se distingue de la plupart de celles qui ont été antérieurement decrites, par ses stries plus visiblement ponctuées ; en outre, si on la compare à *S. conicus*, Desh., du calcaire grossier parisien, on remarque qu'elle a une forme plus conique et moins ovale et que son sommet est plus largement perforé. Quant on la rapproche de *S. altavillensis* du Cotentin et de la Loire inférieure, on trouve qu'elle est plus dilatée en avant, que son ouverture est plus grande et que sa perforation apicale est moins étroite. Enfin *S. fortis*, Brongn., des environs de Roncâ, dans le Vicentin, est plus contracté aux abords du sommet, plus allongé et plus étroit par son galbe général.

Bullinella exigua, *Ten.-Woods.* Pl. i., figs. 31-33.

Référence.—Proc. Linn. Soc. N.S. Wales, vol. IV, p. 19, pl. i., fig. 6 (1880).

Synonymie.—Cylichna exigua, T. Woods *(non Atys exigua*, A. Adams).

Taille grande pour ce genre ; forme cylindracée ; spire tronquée au sommet ; perforée par un entonnoir graduellement rétréci, qui laisse apercevoir l'enroulement étagé de trois ou quatre tours. Dernier tour embrassant toute la coquille, à galbe presque cylindrique, un peu plus étroit en arrière qu'en avant, arrondi à la périphérie de l'entonnoir apical, et à la base qu'est munie d'une fente ombilicale, orné de quelques filets spiraux dans l'entonnoir, de deux ou trois stries très obsolétes au dessus de sa périphérie, de sept stries très écartées sur la base, et de sillons beaucoup plus rapprochés sur la région ombilicale qui porte en outre une rainure spirale isolant une sorte de bourrelet à peine saillant. Ouverture plus longue que le corps du dernier tour, à bords parallèles sur presque toute sa hauteur, arrondie et versante à la base ; labre assez épais, rectiligne ex vertical, dépassant la troncature apicale, avec laquelle il se raccorde par une courbe échancrée et limitée par un rebord calleux ; columelle très courte, excavée, munie d'un pli épais tout à fait en avant, et d'un renflement très obsoléte en arrière.

Dimensions.—Longueur, 16 mill.; diamètre, 6·5 mill.

Localités et néotype.—Muddy Creek (Pl. i., figs. 31-33), ma collection; Cheltenham, Gellibrand River, Spring Creek, River Murray Cliffs, Table Cape.—Eocene.

Affinités.—Par sa taille et par son aspect général, cette espèce ressemble beaucoup à *B. Saint-Hilairei*, Lea, de Claiborne: mais son entonnoir apical est plus anguleux et plus ouvert, muni de filets qui manquent chez l'espèce americaine, ses stries basales sont plus écartées, et son ouverture est moins obliquement tronquée en avant. Elle se distingue de *B. Verneuili*, Desh., du calcaire grossier parisien, par sa forme plus cylindracée, et par sa surface lisse au milieu; elle est moins étroite et plus atténuée en arrière que *B. Bruguierei*, Desh., du bassin de Paris, qui a en outre la columelle plus oblique que l'espèce australienne.

Bullinella angustata, *Tate* and *Cossmann, nov. sp.* Pl. i., fig. 1, 2.

Taille moyenne; forme cylindro-conique, assez étroite; spire tronquée au sommet, à enroulement peu visible au fond d'une étroite perforation. Dernier tour embrassant toute la coquille, à profil à peine arqué, un peu plus atténué en arrière, arrondi à la périphérie de l'angle apical, ovale à la base que est perforée d'une étroite fente ombilicale; surface ornée de stries spirales alternées, les principales un peu plus profondes aux extrémités qu'au milieu; un dernier sillon basal limite un étroit bourrelet contre la fente ombilicale. Ouverture à bords paralléles et très étroite, sur la plus grande partie de sa hauteur, dilatée tout à fait en avant, arrondie et découverte sur son contour supérieur; labre mince, rectiligne, presque vertical, dépassant un peu la troncature apicale et se raccordant avec le bord opposé par une sinuosité profondément échancrée; columelle très courte, excavée, munie en avant d'un léger pli tordu; bord columellaire très étroit, peu calleux, se raccordant avec le contour supérieur.

Dimensions.—Longueur, 10½ mill.; diamètre, 4 mill.

Localité et type.—Adelaide (Pl. ii., fig. 1, 2), ma collection.—Eocene, Austr. Sud.

Affinités.—Cette espèce ne peut être confondue avec *B. exigua*, à cause de sa surface entièrement striée, et de son unique pli columellaire moins saillant; en outre elle est plus étroite et le bec du labre est moins prolongé. Si on la compare à *B. Verneuili*, Desh., du calcaire grossier parisien, qui est striée comme elle sur toute sa surface, on remarque que l'espèce australienne est beaucoup plus étroite, que son ouverture est moins découverte à la base, que sa columelle est plus excavée, non oblique, munie d'un pli plus visible. Elle est enfin moins cylindrique que *B. Bruguierei* et *Saint-Hilairei*, qui s'en distinguent en outre par l'absence de stries au milieu du dernier tour.

Bullinella paucilineata, *Tate* and *Cossmann*, nov. sp. Pl. i., fig. 28-30.

Taille assez grande; forme cylindracée, un peu trapue; perforation apicale étroite, ne laissant pas apercevoir l'enroulement de la spire, située au fond d'un entonnoir arrondi et évasé. Dernier tour embrassant toute la coquille, à galbe légérement ovale, arrondi à la périphérie de l'entonnoir apical, ovale à la base qui est imperforée, orné de sillons spiraux très visibles, plus écartés au milieu qu'aux extrémités, se prolongeant à l'interieur de l'entonnoir apical et sur la région ombilicale où ils sont presque imbriqués. Ouverture à bords non parallèles, rétrécie en arrière, graduellement dilatée et arrondie en avant, où elle est obliquement versante; labie mince, renversé à gauche de l'axe du côté anterieur, vertical au milieu, arrondi en arrière; columelle régulièrement excavée, portant au milieu un renplement à peine visible; bord columellaire assez large, mince en arrière, calleux et détaché à la base, se terminant en pointe à l'extrémité du contour supérieur.

Dimensions.—Longueur, 11 mill.; diamètre, 5 mill.

Localité et type.—Spring Creek, (Pl. i., fig. 28-30), ma collection.—Eocene, Victoria.

Affinités.—Cette espéce se distingue facilement de *B. exigua* et de *B. Saint-Hilairei* par sa forme moins cylindrique et moins étroite, par l'ornementation qui couvre toute sa surface, par son sommet moins tronqué et plus arrondi, par sa perforation apicale plus étroite, par sa columelle non plissée. Elle appartient encore au groupe de *Bullinella* typiques et se distingue des *Cylichnina* par son entonnoir apical beaucoup plus ouvert que celui des *B. galba*, Conrad, espéce de Claiborne, qui est à peu près à la limite de séparation des deux groupes et que beaucoup d'auteurs ont même confondee spécifiquement avec *B. Saint-Hilairei.*

Bullinella aratula, *nov. sp.* Pl. ii., fig. 3, 4.

Taille moyenne; forme cylindracée, subconoïdale; spire tronquée au sommet, largement perforée au fond d'un entonnoir à peu près conique. Dernier tour embrassant toute la coquille, à galbe un peu ovale, plus atténué en arrière qu'à la base, subanguleux à la périphérie de l'entonnoir apical, orné de stries finement ponctués et écartées au milieu, qui se transforment du côté postérieur en larges rainures séparées par des cordons plus etroits et se prolongeant à l'interieur de l'entonnoir; sur la base, les sillons spiraux sont à peine plus serrés qu'au milieu du dernier tour, mais ils sont plus pronds et subimbriqués. Ouverture plus allongée que le corps de la coquille, à bords non paralléles rétrécie en arrière, dilatée et arrondie en avant où elle est peu versante; labre légérement arqué, se prolongeant en arrière par un bec

échancré à sa jonction avec le bord opposé dans l'entonnoir ; columelle courte et très excavée, sans pli ni renflement ; bord columellaire calleux et aplati, un peu détaché de la base, se raccordant par son contour caréné avec le bord supérieur.

Dimensions.—Longueur, 10 mill. ; diamètre, 4·5 mill.

ètroit qui dépasse de plus d'un millimètre la troncature apicale,

Localités et type.—Mornington (Pl. ii., fig. 3, 4), ma collection ; Muddy Creek, Gellibrand River, Fyansford, Corio Bay.—Eocene, Victoria.

Affinités.—Quoique cette coquille soit très voisine de *B. paucilineata*, il me parait nécessaire de l'en séparer à cause de son ornementation bien differente du côté posterieure, et aussi parce qu'elle porte un bec à l'extrémité inferieure du labre ; en outre, son bord columellaire est plus aplati, son labre ést moins rectiligne. Tous ces caractéres l'eloignent encore davantage des autres *Bullinella* connues dans l'Eocéne d'Europe et des Etats Unis.

Bullinella cuneopsis, *nov. sp.* Pl. ii., fig. 5, 6.

Taille médiocre ; forme conique ; somnet tronquée en entonnoir, muni d'une perforation laissant apercevoir l'enroulement des tours de spire. Dernier tour embrassant toute la coquille, à profil presque rectiligne, coniquement atténué en arrière, ovalement arrondi à la base, qui est à peu prés entiérement imperforée ; surface entiérement lisse. Ouverture un peu plus longue que le corps de la coquille, à bords paralléles, retrécie et contractée en arrière, dilatée subitement et arrondie du côte anterieur, où elle n'est presque pas versante ; labre mince, peu renversé à gauche de l'axe du coté anterieur, rectiligne et vertical sur presque toute sa hauteur, légérement sinneux en arrière, où il forme un bec qui dépasse la troncature apicale ; columelle très courte, droite, faisant un angle de 130° anec la base de l'avant-dernier tour, un peu gonflée au milieu, mais sans pli apparent ; bord columellaire étroit, un peu détaché de la base, se raccordant avec le contour supérieur par une courbe presque régulière.

Dimensions.—Longueur, 5 mill. ; diamètre à la base, 2·25 mill.

Localité et type.—Muddy Creek (Pl. ii., fig. 5, 6), ma collection.—Eocene : Victoria.

Affinités.—Cette espèce se reconnait aisément par sa forme tout-à-fait conique et rétrécie en arrière, par sa surface lisse et son ouverture contractée ; son galbe est plus rectiligne que celui de *B. conulus*, Desh., du calcaire grossier parisien, et d'ailleurs elle s'en distingue par sa surface non striée, par l'absence de pli à la columelle, par son sommet moins étroitement perforé. Quant à *B. conoïdea*, Desh., de l'Oligocéne d'Europe, c'est une espèce dont la perforation apicale est plus etroite, presque recouverte par la callosité de l'attache du labre, et dont le galbe est plus ovale.

Bullinella infundibulata, *nov. sp.* Pl. ii., fig. 15, 16.

Taille médiocre ; forme ovoïdo-conique, un peu trapue ; sommet tronqué en entonnoir assez profond, laissant apercevoir l'enroulement de trois tours étagés, pleins et déclives, ainsi que le nucléus embryonnaire globuleux et lisse. Dernier tour embrassant toute la coquille, ovale au milieu et en avant, atténué en arrière et caréné à la périphérie de l'entonnoir apical, très finement orné, sur toute la surface de stries spiralés extrêmement serrées, qui s'écartent et deviennent plus profondes sur la base ; il n'y a pas de fente ombilicale, mais une étroite rainure imperforée, limitée par un sillon obsolète. Ouverture très étroite en arrière, subitement dilatée et arrondie en avant ; labre, à peu prés rectiligne et vertical sur la plus grande partie de sa hauteur ne dépassant pas la troncature apicale ; columelle courte et droite, coudée en avant par une torsion pliciforme, bord columellaire aplati, un peu calleux, limité à l'extérieur par une caréne qui se raccorde en courbe avec le contour supérieur.

Dimensions.—Longueur, 6 mill. ; diamètre, 3 mill.

Localités et type.—Gellibrand River (Pl. ii., fig. 15, 16), ma collection ; Spring Creek, Fyansford, Corio Bay, Birregurra, Muddy Creek.—Eocene : Victoria.

Affinités—Moins conique et plus trapue que *B. cuneopsis*, cette espèce s'en distingue en outre par sa surface entiérement striée, par sa troncature apicale et par l'absence de bec au labre, &c. ; si on la compare à *B. goniophora*, Desh., du bassin de Paris, qui a aussi une troncature carénée on remarque qu'elle est moins cylindrique, que sa columelle est moins oblique et plus tordue, que la base est imperforée et que son ouverture est plus dilatée en avant. Quant à *B. acrotoma*, Cossm., de Claiborne, c'est une espèce dont la spire est masquée par une callosité tout à fait caracteristique.

Bullinella altiplica, *nov. sp.* Pl. ii., fig. 9-11.

Taille petite ; forme ovoïdo-cylindrique, courte et trapue ; sommet tronqué en entonnoir large et peu profond laissant apercevoir l'enroulement des quatre tours de spire jusqu'au nucléus embryonnaire, avec de petits plis d'accroissement curvilignes. Dernier tour embrassant toute la coquille, à profil ovalisé, régulièrement atténué à ses deux extrémités, caréné à la périphérie de l'entonnoir apical, lisse en arriére, orné de quelques stries spirales très peu visibles sur la base qui est imperforée. Ouverture rétrécie en arriére où les bords ne sont paralléles que sur une faible hauteur, dilatée, arrondie et découverte en avant ; labre un peu arqué dépassant à peine la troncature du sommet ; columelle excavée, munie tout à fait à la base d'un pli tordu qui se raccorde avec le contour interne du rebord supérieur ; bord

columellaire etroit, calleux, aplati, limité par une caréne qui se raccorde avec le contour externe du bord supérieur.

Dimensions.—Longueur, 3·5 mill.; diamètre, 1·75 mill.

Localité et type.—Mornington (Pl. ii., fig. 9-11), ma collection. —Eocene, Victoria.

Affinités.—Cette coquille ne peut se confondre avec aucune des *Bullinella* que je connais dans l'Eocéne, à cause de sa spire bien visible dans l'entonnoir caréné que ferme la troncature apicale ; en outre la position tout à fait anterieure de son pli columellaire est un caractére qui est particulier à cette espèce. Elle est d'ailleurs beaucoup plus trapue que la plupart de ses congénéres et ressemble, par son galbe, à une *Roxania ;* mais elle n'a pas la columelle tronqué á la base.

Bullinella phanerospira, *nov. sp.* Pl. ii., figs. 12-14.

Taille petite ; forme ovoïde et trapue ; sommet tronqué en entonnoir un profond, laissant apercevoir l'enroulement de quatre tours convexes, séparés par de profondes sutures, avec une petite perforation apicale au centre. Dernier tour embrassant toute la coquille, ventru, ovale, également atténué à ses deux extrémités, arrondi à la périphérie de la troncature de la spire, entiérement lisse, sauf quelques striés très fines et très serrées sur la base qui est imperforée. Ouverture très étroite et contractée en arrière, dilatée et arrondie en avant ; labre arqué, un peu épaissi et réfléchi en arrière, muni d'un bec court à la jonction avec la troncature apicale ; columelle courte et droite, munie d'une torsion pliciforme du côté antérieur ; bord columellaire calleux et aplati, appliqué sur la base, se raccordant avec le contour supérieur.

Dimensions.—Longueur, 3·25 mill.; diamètre, 2 mill.

Localité et type.—Muddy Creek (Pl. ii., figs. 12-14), ma collection.—Eocene, Austr. Sud.

Affinités.—Cette espéce est extrêmement voisine de *B. altiplica*, et j'ai beaucoup hésité à ne la considérer que comme une simple varieté, d'autant plus qu'il y a quelques individus intermédiaïres et douteux ; cependant on distingue assez facilement les deux échantillons types, par la forme beaucoup plus ventrue de *B. phanerospira*, qui n'a pas de caréne périphérique à la troncature apicale, dont la spire a des tours arrondis, dépourvus de plis d'accroissement ; le dernier tour a le galbe plus gonflé au milieu, plus obliquement déclive en arrière, et sa base est ornée de stries plus serrées ; l'ouverture est plus contractée en arrière, la labre est plus arqué, plus réfléchi ; le pli columellaire est beaucoup moins saillant. On peut donc admettre la séparation de cette espéce.

Roxania Woodsi, *Tate*. Pl. ii., fig. 7-6.

Référence.—Cylichna Woodsi, Proc. Roy. Soc., Tasmania, for 1883, p. 211 (1884); *id*, p. 228 (1885).

Synonymie.—Cylichna arachis, Ten.-Woods, *op. cit.*, p. 102 (1877); non Quoy.

Taille grande; forme réguliérement ovale, un peu ventrue; sommet étroitement perforé, ne laissant pas apercevoir la spire. Dernier tour embrassant toute la coquille, un peu plus atténué en arrière qu'en avant, entiérement couvert de fines stries spirales ponctuées, inéquidistantes, plus profondes, plus espacés et subimbriquées sur la base qui est étroitement perforée d'une fente ombilicale. Ouverture assez large, dilatée et arrondie en avant; labre à peu pres vertical, sans bec ni échancrure à sa jonction avec la perforation apicale; columelle excavée en arc de cercle, tronquée à la base par un pli tordu et peu saillant, qui se raccorde par une courte hélice avec le contour supérieur; bord columellaire calleux, détaché de la fente ombilicale, se terminant contre la courbe héliçoidale du pli columellaire.

Dimensions.—Longueur, 15·5 mill.; diamètre, 7·5 mill.

Localité et type.—Table Cape (Pl. ii., fig. 7, 8), ma collection. Eocene, Tasmania.

Affinités.—Cette espèce est moins ventrue et plus allongée que *R. utriculoides*, Bosquet, de l'Oligocéne de Belgique; elle a la columelle beaucoup plus tronquée que *R. ovulata*, Lamk., du calcaire grossier parisien. Si on la compare á *R. biumblicata*, Desh., du calcaire grossier de Parnes, on trouve qu'elle est moins globuleuse, moins étroitement perforée au sommet, que ses stries spirales sont plus fines, que sur bord columellaire est plus large et plus aplati. Quant à *R. cincta*, Desh., du Paléocéne des environs de Paris c'est une espèce á sommet imperforé, dont les sillons spiraux sont bien plus écartés que les stries de l'espèce australienne. *R. oviformis*, Meyer, de Jackson (Mississipi) est plus trapue et plus cylindracée et a la columelle plus droite, plus mince, l'ouverture plus arquée, le sommet plus étroitement perforé.

Roxania scrobiculuta, *Tate* and *Cossmann, nov. sp.* Pl. ii., fig. 17, 18.

Taille médiocre; forme globuleuse; sommet trés étroitement perforé; deruier tour embrassant toute la coquille, réguliérement ellipsoïdal, un peu atténué à la base qui est dépourvue de fente ombilicale, orné sur toute la surface de sillons ponctués, inéquidistants, plus écartés au milieu qu'aux extrémités. Ouverture arquée, rétrécie en arrière, dilatée et arrondie en avant; labre mince un peu arqué, formant un bec peu saillant et faiblement échancré à sa jonction avec la perforation apicale; columelle courte, droite, à peine inflechié par une légére torsion antérieure, se terminant en pointe sans faire de crochet contre le bord

supérieur ; bord columellaire un peu calleux, appliqué sur la base.

Dimensions.—Longueur, 6·5 mill.; diamètre, 4·5 mill.

Localités et type.—Muddy Creek (Pl. ii., fig. 17, 18), ma collection ; River Murray Cliffs.—Eocene.

Affinités.—Cette coquille ne peut se confondre avec *R. Woodsi*, parce qu'elle est beaucoup plus globuleuse et que ses sillons sont plus écartés ; elle ressemble beaucoup à *R. biumbilicata*, Desh., du calcaire grossier parisien, mais elle s'en distingue par sa forme plus ellipsoïdale et plus renflée, par ses sillons moins profonds et moins réguliers, surtout par l'absence de fente ombilicale. Si on la compare à *R. utriculoides*, Bosquet, de l'Oligocéne de Belgique, on trouve qu'elle s'en écarte par l'absence de fente ombilicale, par ses sillons inéquidistants, par sa columelle moins excavée ; enfin *R. oviformis*, Meyer, de Jackson (Mississipi), a une forme moins elliptique, un pli columellaire plus saillant et est munie d'une fente ombilicale.

Roxania (?) bullæformis, *nov. sp.* Pl. ii., figs. 21, 22.

Taille petite ; forme ovoïde, ventrue ; sommet étroitement perforé ; dernier tour embrassant toute la coquille, un peu contracté en arrière, arrondi à la base qui est perforée d'un entonnoir ombilical assez largement ouvert ; surface ornée de stries spirales très fines et très serrées au milieu, plus profondes et plus écartées aux extrémités, sauf sur la région ombilicale où elles se rapprochent davantage que sur la base. Ouverture plus longue que le corps de la coquille, arquée, peu rétrecie en arrière, peu dilatée et versante à la base ; labre un peu épaissi, à peu prés rectiligne et légérement oblique, formant un angle sur son contour postérieur, se prolongeant par un bec saillant, large et versant, beaucoup au delà du sommet ; columelle coudée, se raccordant avec le contour supérieur ; bord columellaire calleux, caréné à l'exterieur et détaché de la base.

Dimensions.—Longueur, 4·25 mill. ; diamètre, 2·5 mill.

Localité et type.—Muddy Creek (Pl. ii., fig. 21, 22), ma collection.—Eocene : Victoria.

Affinités.—Cette espèce se distingue de la plupart de ses congénéres par sa columelle presque pas tronquée : cependant je ne puis me résoudre à la placer dans le genre *Bullinella* dont elle s'écarte par sa forme générale, par son ornementation, par sa columelle coudée. C'est une forme dont le classement est très embarrassant et probablement pas définitif ; en tous cas, elle est facilement reconnaissable par sur entonnoir ombilical et par la contraction bien visible du galbe posterieur de son dernier tour.

Cylichnella callosa, *Tate* and *Cossman, nov. sp.* Pl. ii., fig. 19, 20.

Taille moyenne ; forme cylindracée, médiocrement trapue ; sommet étroisement perforé, spire invisible ; dernier tour embras-

sant toute la coquille, à galbe ovale, également atténué à ses deux extrémités, qui sont ornées de sillons spiraux peu visibles et assez écartés; base munie d'une fente ombilicale tres étroite. Ouverture un peu plus longue que le corps de la coquille, rétrécie à bords paralléles en arrière, à peine dilatée en avant et découverte à la basé ; labre mince, renversé à gauche de l'axe du côté antérieur, vertical et peu arqué au milieu, formant un bec court à la jonction avec la perforation apicale ; columelle calleuse très courte, peu excavée, munie de deux plis, l'inférieur lamelleux et saillant forme la limite externe du bord columellaire, l'antérieur plus petit et plus épais se raccorde avec le précédent au contour supérieur.

Dimensions.—Longueur, 10 mill.; diamètre, 4 mill.

Localités et type.—Aldinga (Pl. ii., fig. 19, 20), ma collection ; Cape Otway.—Eocene, Austr. Sud. et Victoria.

Affinités.—Cette espèce ne ressemble à *C. Bourdoti*, Cossm., de l'Eocéne des environs de Nantes, que par sa plication columellaire et par sa perforation apicale ; mais elle s'en distingue par sa forme plus etroite et plus cylindrique, par l'absence de plis axiaux au sommet, et par son ouverture plus découverte à la base, de sorte qu'elle a plutôt l'aspect d'une *Bullinella ;* seulement elle s'écarte des espèces de ce genre par son double pli columellaire.

Ringicula lactea, *Johnston.* Pl. ii., figs. 23-24.

Référence.—Proc. Roy. Soc. Tasmania for 1879, p. 34, 1880.

Taille petite ; forme buccinoïde, un peu allongée ; spire pointue, à galbe conique ; embryon petit, à nucléus subglobuleux et dévié ; cinq tours un peu convexes, dont la hauteur est un peu inférieure à la moitié de la largeur, séparés par de profondes sutures ; subétagés par une rampe obsolète, ornés de quatre stries spirales écartés. Dernier tour peu supérieur aux deux tiers de la hauteur totale, peu ventru, subanguleux au dessus de la suture, arrondi à la base qui est imperforée, régulièrement orné, sur toute la surface, d'une douzaine de stries spirales écartées et de plis d'accroissement irréguliers et obsolètes. Ouverture égale à la moitié de la longueur totale, large en travers, canaliculée en arrière, largement échancrée à la base ; labre vertical épaissi et bordé par un large bourrelet qui envahit la moitié de l'avant-dernier tour, lisse à l'interieur avec un renflement un peu plus saillant au dessus du canal posterieur de l'ouverture ; trois plis columellaires épais, les deux anterieurs lamelleux et très saillants, le pariétal plus écarté, écrasé à sa naissance ; bord columellaire très calleux et très étalé.

Dimensions.—Longueur, 5 mill. ; diamètre, 3 mill.

Localités et néotype.—Table Cape (Pl. ii., fig. 23-24), Muddy Creek, ma collection.—Eocene ; Tasmania ; Victoria.

Affinités—Cette espèce se distingue aisément de la plupart des *Ringicula* typiques de l'Eocéne d'Europe et des Etats Unis, par l'absence de crénelures à l'interieur du labre ; elle s'écarte des formes néogenes par sa forme allongée et peu gonflée.

Ringicula Tatei, *nov. sp.* Pl. ii., fig. 32, 33.

Taille très petite ; forme buccinoïde, un peu trapue ; spire peu allongée, à galbe conique ; embryon à nucléus obtus et peu dévié ; quatre à cinq tours à peine convexes, dont la hauteur égale la moitié de la largeur, séparés par des sutures linéaires, ornés de six stries spirales assez fines. Dernier tour égal aux deux tiers de la hauteur totale, globuleux, arrondi à la base qui est imperforée, régulièrement orné de stries spirales équidistantes, sauf celles qui bordent la suture et qui sont un peu plus serrées. Ouverture large et courte, profondément canaliculée en arrière, entaillée à la base par une échancrure assez étroite ; labre très epais, un peu oblique, bordé à l'exterieur par un énorme bourrelet dont l'extrémité amincie se prolonge sur la moitié de la hauteur de l'avant dernier tour, lisse à l'interieur avec un renflement médian qui accentue la gouttière posterieure de l'ouverture ; trois plis columellaires très inégaux, l'anterieur assez epais et un peu oblique, l'inférieur mince, transverse et moins saillant, le pariétal extrêmement épais et aplati à sa naissance ; bord columellaire large, étalé, très callaux, s'élevant presque aussi haut que la saillie du bord opposé.

Dimensions.—Longueur, 3·5 mill. ; diamètre, 2 mill.

Localité et type.—Muddy Creek (Pl. ii., fig. 32, 33), ma collection.—Eocene et Miocene, Victoria.

Affinités.—Beaucoup plus courte et plus ventrue que *R. lactea*, cette espèce s'en distingue en outre par ses stries moins écartées, par l'absence de rampe déclive au dessus de la suture, par les plis plus inégaux.

Ringicula teniulirata, *nov. sp.* Pl. ii., fig. 27, 28.

Taille très petite ; forme buccinoïde ; spire un peu allongée, à galbe subconoïdal ; embryon obtus, à peine dévié ; quatre tours un peu convexes, dont la hauteur dépasse la moitié de la largeur, séparés par des sutures linéaires, ornés de très fines stries spirales. Dernier tour égal aux trois cinquiemes de la hauteur totale, ovale, arrondi à la base qui est imperforée, entièrement couvert de stries spirales, régulières et serrées, finement ponctuées par les accroissements. Ouverture large et ovale échancrée à les deux extrémités ; labre épais, obliquement incliné en avant, bordé d'un large bourrelet aplati, lisse à l'intérieur, subitement aminci et presque creusé du côté postérieur ; trois plis columellaires divergents, minces, lamelleux, l'anterieur contournant la profonde échancrure basale de l'ouverture ; bord columellaire à peu près nul.

Dimensions.—Longueur, 2·5 mill.; diamètre, 1·5 mill

Localités et type.—Spring Creek (Pl. ii., fig. 27-28), ma collection; Gellibrand River, Mornington.—Eocene, Victoria.

Affinités.—Cette espèce ressemble à *R. Tatei*, mais ses stries sont plus fines et moins visibles, ses plis columellaires sont plus lamelleux, plus égaux, son bord columellaire n'existe, pour ainsi dire, pas; sa forme générale est moins trapue, et sa spire est plutôt conoïdale que conique. L'absence de crénelures au labre ne permet pas de la classer dans le groupe des *Ringicula* typiques, comme l'espèce suivante, dont elle se distingue d'ailleurs par sa spire moins allongée.

Ringicula prælonga, *nov. sp.* Pl. ii., fig. 25-26.

Taille petite; étroite, ovoïdo-conique; spire longue, subulée, à galbe régulièrement conique; embryon obtus, à peine dévié; six tours légèrement convexes, dont la hauteur atteint presque les deux tiers de la largeur, séparés par des sutures profondes et subcanaliculées, ornés de huit sillons spiraux, un peu plus serrés en avant qu'en arrière. Dernier tour égal aux trois cinquiémes de la hauteur totale, à galbe arrondi, surtout à la base qui est à peine perforée d'une fente ombilicale très étroite; surface entièrement couverte de sillons spiraux, profonds et réguliers, un peu plus serrés sur la base. Ouverture très courte, large, canaliculée en arrière, profondément échancrée à la base; labre assez epais, bordé à l'exterieur par un bourrelet large et aplati qui dépasse à peine la suture, portant à l'interieur quelques crénelures divisées en deux groupes séparés par un intervalle lisse; columelle courte et excavée, munie de deux plis minces, lamelleux, très saillants et paralléles, pli parietal très écarté, peu proéminent et peu épais; bord columellaire peu calleux, bien moins élevé à la base que la saillie du bord opposé.

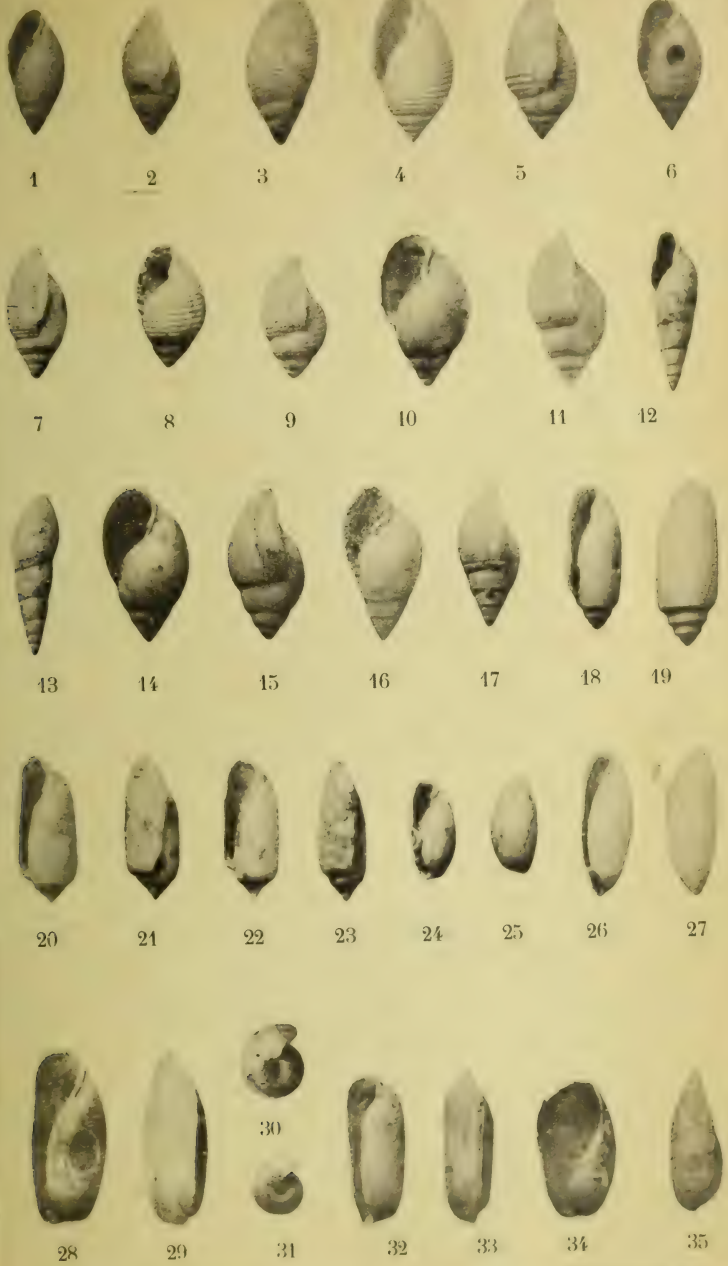
Dimensions.—Longueur, 4·5 mill.; diamètre, 2·25 mill.

Localité et type.—Muddy Creek (Pl. ii., figs. 24-26), ma collection.—Eocene, Victoria.

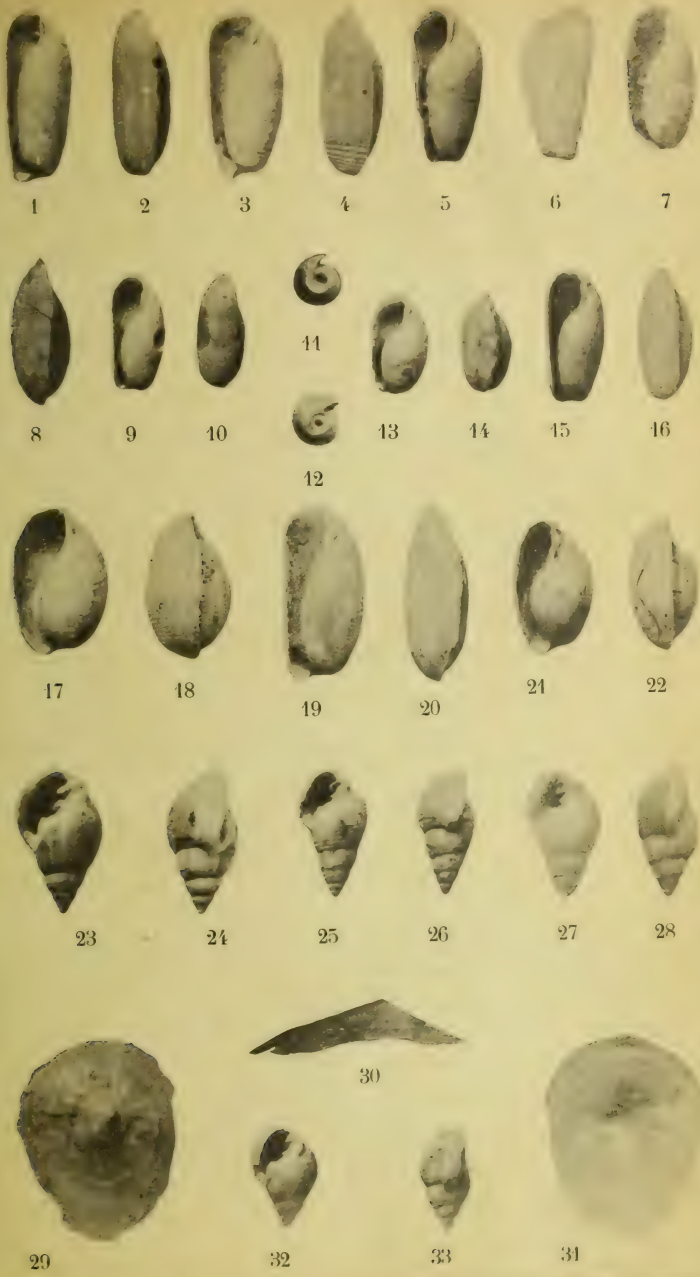
Affinités.—Cette espèce ne peut être confondue avec *R. lactea*, non seulement à cause de son ornementation et de sa forme plus étroite, de sa spire plus allongée et de ses tours plus élevés, de ses plis plus minces, mais surtout à cause des crénelures obsolètes de son labre, qui la placent dans le groupe typique du genre *Ringicula*. Elle s'écarte cependant de *R. ringens*, Lamk., de l'Eocene des environs de Paris, par ses sillons plus profonds par son ouverture moins calleuse, par ses crénelures labiales moins fines et disposées en deux séries avec un intervalle lisse.

Umbrella australiensis, *nov. sp.* Pl. ii., fig. 29-31.

Taille assez grande; test mince; forme elliptique, subcirculaire, un peu élevée et irrégulière; sommet presque central, à nucleus



Pissarro, photogr. Sohier à Paris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embryonnaire globuleux, dévié et un peu enroulé ; surface extérieure lisse, gauchie marquée par des dépressions rayonnantes très obsolètes, ornée de plis d'accroissement irréguliers et peu saillants. Surface interne brillante, avec quelques rayons indistincts ; impression musculaire assez étroite, irrégulièrement frangée.

Dimensions.—Longueur, 27 mill.; largeur, 22 mill.; hauteur, 5 mill.

Localité et type.—Mornington (Pl. ii., fig. 29-31), ma collection ; Muddy Creek, River Murray Cliffs.—Eocene, Victoria et Austr. Sud.

Affinités.—Cette espèce est beaucoup plus grande, plus mince et moins aplatie qu' *U. laudunensis* de l'Eocéne inférieur du bassin de Paris.

EXPLICATION des PLANCHES.

Pl. I.

Fig.
1- 3. Actæon scrobiculatus, *T. Woods.* (2/2) Spring Creek, Table Cape.
4- 5. Actæon funiculifer, *Cossm.* (2/2) Muddy Creek.
6- 7. Actæon distinguendus, *Cossm.* (2/2) Muddy Creek.
8- 9. Actæon subscalatus, *Cossm.* (4/1) Aldinga.
10-11. Actæon evanescens, *Cossm.* (4/1) Adélaïde.
12-13. Actæon olivellæformis, *Tate.* (2/2) Muddy Creek.
14-15. Semiactæon microplocus, *Cossm.* (?/1) Murray Cliffs.
16-17. Triploca ligata, *Tate.* (4/1) Adélaïde.
18-19. Tornatina longispira, *Cossm.* (4/1) Muddy Creek.
20-21. Tornatina pachyptycha, *Cossm.* (3/1) Muddy Creek.
22-23. Tornatina aptycha, *Cossm.* (3/1) Muddy Creek.
24-25. Volvulella inflatior, *Cossm.* (6/1) Spring Creek.
26-27. Volvulella Tatei, *Cossm.* (4/1) Muddy Creek.
28-30. Bullinella paucilineata, *Tate* and *Cossm.* (?/1) Sprink Creek.
31-33. Bullinella exigua, *T. Woods.* (5/1) Muddy Creek.
34-35. Scaphander Tatei, *Cossm.* (?/1) Muddy Creek.

Pl. II.

1- 2. Bullinella angustata, *Tate* and *Cossm.* (?/1) Adélaïde.
3- 4. Bullinella aratula, *Cossm.* (?/1) Mornington.
5- 6. Bullinella cuneopsis, *Cossm.* (4/1) Muddy Creek.
7- 8. Roxania Woodsi, *Tate.* (2/2) Table Cape.
9-11. Bullinella altiplica, *Cossm.* (5/1) Mornington.
12-14. Bullinella phanerospira, *Cossm.* (5/1) Muddy Creek.
15-16. Bullinella infundibulata, *Cossm.* (6/1). Gellibrand River.
17-18. Roxania scrobiculata, *Tate* and *Cossm.* (3/1) Muddy Creek.
19-20. Cylichnella callosa, *Tate* and *Cossm.* (3/1) Muddy Creek.
21-22. Roxania (?) bullæformis, *Cossm.* (4/1) Muddy Creek.
23-24. Ringicula lactea, *Johnston.* (4/1) Table Cape.
25-26. Ringicula prælonga, *Cossm.* (4/1) Muddy Creek.
27-28. Ringicula tenuilirata, *Cossm.* (6/1) Spring Creek.
29-31. Umbrella australensis, *Cossm.* (g.n.) Mornington.
32-33. Ringicula Tatei, *Cossm.* (5/1). Muddy Creek.

ERRATA.

Page 11, ligne 15, au lieu de Pl. i. lisez Pl. ii.
Page 16, ligne 1, au lieu de fig. 7-6 lisez fig. 7-8.

List of Birds Collected or Observed in the Neighbourhood of Laura, S.A.,

By M. Morgan, M.D.

[Read November 3, 1896].

The nomenclature adopted is that of Gould's Handbook to the Birds of Australia. The skins obtained are now in the South Australian Museum.

1. Aquila audax
2. Haliastur sphenurus
3. Falco hypoleucus
4. Falco melanogenys
5. Falco lunulatus
6. Hieracidea berigora
7. Tinnunculus cenchroides
8. Accipiter torquatus
10. Circus assimilis (Gld. Hdbk. sp. 26)
11. Circus jardinii (Gld. Hdbk. sp. 27)
12. Strix delicatula
13. Spiloglaux boobook (female)
14. Spiloglaux marmoratus (male)
15. Ægotheles novæ-hollandiæ
16. Podargus strigoides
17. Cypselus pacificus
18. Hirundo frontalis
19. Petrochelidon nigricans
20. Lagenoplastes ariel
21. Cheramœca leucosternum
22. Merops ornatus
23. Dacelo gigas
24. Todirhamphus pyrrhopygius
25. Artamus sordidus
26. Artamus personatus
27. Artamus superciliosus
28. Pardalotus striatus
29. Pardalotus xanthopygius
30. Strepera arguta (?) melanoptera
31. Gymnorhina tibicen
32. Gymnorhina leuconota
33. Grallina picata
34. Graucalus melanops

35. Campephaga humeralis
36. Pachycephala rufiventris
37. Collyriocincla harmonica
38. Falcunculus frontatus
39. Oreoïca cristata
40. Rhipidura albiscapa
41. Sauloprocta motacilloides
42. Seisura inquieta
43. Micræca fascinans
44. Smicrornis brevirostris
45. Petrœca leggii
46. Petrœca goodenovii
47. Melanodryas cucullata
48. Malurus melanotus
49. Malurus lamberti
50. Malurus leucopterus
51. Acanthiza nana
52. Acanthiza pyrrhopygia
53. Geobasileus chrysorrhæa
54. Ephthianura albifrons
55. Ephthianura aurifrons
56. Ephthianura tricolor
57. Xerophila leucopsis
58. Anthus australis
59. Calamoherpe australis
60. Cincloramphus cruralis
61. Ptenoëdus rusfescens
62. Mirafra horsfieldi
63. Staganopleura guttata
64. Taeniopygia castanotis
65. Corvus australis
66. Pomatostomus superciliosus
67. Meliornis novæ-hollandiæ
68. Glyciphila fulvifrons
69. Glyciphila albifrons
70. Ptilotis penicillata
71. Acanthogenys rufigularis
72. Acanthochaera carunculata
73. Myzomela nigra
74. Melithreptus gularis
75. Melithreptus brevirostris
76. Myzantha flavigula
77. Dicæum hirundinaceum
78. Zosterops coerulescens
79. Climacteris scandens
80. Cacomantis pallidus

81. Cacomantis flabelliformis
82. Mesocalius oscularis
83. Lamprococcyx plagosus
84. Lamprococcyx basalis
85. Cacatua galerita
86. Platycercus flaveolus
87. Platycercus barnardi
88. Psephotus hæmatonotus
89. Euphema chrysostoma
90. Melopsittacus undulatus
91. Calopsitta novæ-hollandiæ
92. Trichoglossus multicolor
93. Glossopsitta australis
94. Glossopsitta porphryocephala
95. Glossopsitta pusilla
96. Phaps chalcoptera
97. Geopelia tranquilla
98. Stictopelia cuneata
99. Turnix velox
100. Coturnix pectoralis
101. Choriotis australis
102. Œdicnemus grallarius
103. Lobivanellus lobatus
104. Sarciophorus pectoralis
105. Ægialites nigrifrons
106. Himantopus leucocephalus
107. Carphibis spinicollis
108. Ardea pacifica
109. Ardea novæ-hollandiæ
110. Nycticorax caledonicus
111. Tribonyx ventralis
112. Hypotaenidia philippensis
113. Anas superciliosus
114. Anas punctata
115. Chlamydochen jubata
116. Phalacrocorax nova-hollandiæ
117. Phalacrocorax varius

Notes on Australian Typhlopidæ.

By Edgar R. Waite, F.L.S., Zoologist, Australian Museum, Sydney.

[Read April 6, 1897.]

Plate III.

The present contribution is the outcome of an examination of specimens sent to me from the South Australian Museum by the Director, Dr. E. C. Stirling. Further particulars will be included in a future article. When all available material has been examined, I propose to write on the distribution of the family in Australia, but for the present content myself with the description and illustration of a new and interesting species and some remarks on the identity of other forms.

9*. Typhlops pinguis, *sp. nov.*

Habit very stout, of tolerable even thickness. Head short; snout fairly prominent with rather sharp edge. Rostral, above half the width of the head, extending nearly to the level of the eyes, slightly narrowed in front, the portion visible from beneath a little broader than long; nasal incompletely divided, the fissure extending from the anterior half of the second labial; nostrils inferior; preocular narrower than the ocular, in contact with the second and third labials. Eye distinct. Four upper labials. Diameter of the middle of the body about two and twenty times in the total length. Tail as long as broad, ending in an obtuse spine. Twenty scales round the body.

Colors.—In spirits, brownish-yellow above, somewhat lighter beneath.

Dimensions.—Total length, 348 mm. Length of head, 8 mm.; width of head, 10 mm. Width of body, 15·5 mm. Length of tail, 12·5 mm.; width of tail, 12·5 mm.

Hab.—South Australia, one example.

Type.—In the South Australian Museum.

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* Previous species-numbers were published as follows:—1-3. Records Austr. Mus. II. (1893), pp. 57-62, pl. XV. 4-8. Proc. Linn. Soc., N.S.W., IX. (1894), pp. 9-14, pl. T.

The circumstance of the nasal fissure being in contact with the second labial, and the scales round the body being in 20 rows, limits the Australian species from which *T. pinguis* requires to be distinguished to three, namely, *T. bituberculatus*, Peters,* *T. leucoproctus*, Boul.,† and *T. wiedii*, Peters.‡ All these are elongate forms, the diameter of the body being contained at most 44, 40, and 42 times respectively in the total length; whereas in *T. pinguis* the diameter is 22 in the length, or nearly twice that of any of the others; it is in fact the stoutest Australian species known.

Should further distinction be required, it may be mentioned that the trilobed snout of the first-named is a character which renders that species unmistakeable. The narrow rostral and lateral position of the nostrils sufficiently sunders *T. leucoproctus*, while *T. Wiedii* may be at once recognised by the fact that the nasal fissure extends on to the upper surface of the snout, almost dividing the plate.

10. Typhlops australis, *Gray*, and T. bicolor, *Peters*.

The collection includes a number of examples which I confess I cannot decide whether to name *T. australis*§ or *T. bicolor*;‖ they are certainly one or the other.

A glance at Boulenger's work shows that this writer widely separates the species in his synopsis,¶ the former being included in the main division, characterised by having the "snout rounded," and the latter in that distinguished by the snout having an "obtusely angular horizontal edge."

Referring to the respective epitomised descriptions,** we find that this is the only important difference between the two. The number of scales (22) round the body, the character of the nasal fissure, and the diameter of the body (33–37 and 30–34 respectively) are the same. The enlarged head scales do not appear to be distinguishing features, and the proportional width of the rostral to the head is only slightly different (three-fifths in *T. australis*, and one-half in *T. bicolor*).

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* Peters, Monatsb. d. k. Akad. d. W. Berlin, 1863, p. 233; and 1867, p. 708, fig. 4.

† Boulenger, Ann. and Mag. Nat. Hist. (6) IV., 1889, p. 361; and Cat. Snakes in Brit. Mus., T., 1893, p. 20, pl. I., fig. 6.

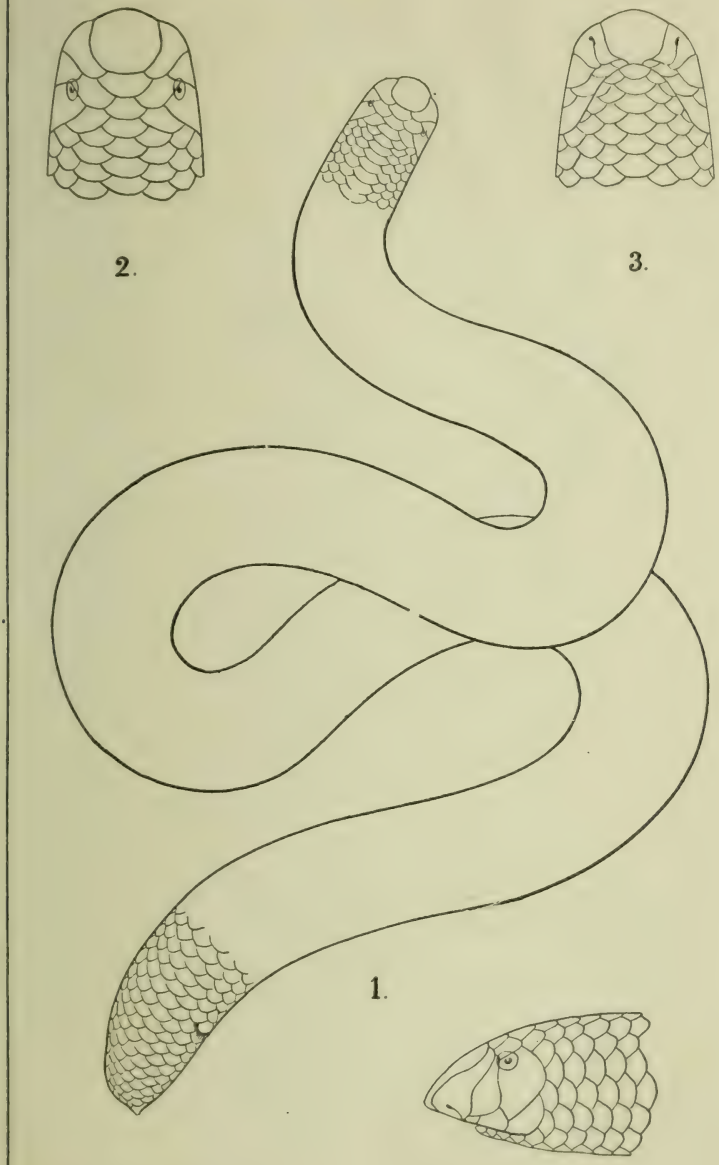
‡ Peters, *loc. cit.*, 1867. p. 24, and Waite, Proc. Linn. Soc., N.S.W., IX., 1894, p. 13, pl. T., figs. 7, 8, and 9.

§ Gray. Cat. of Lizards, Brit. Mus. (1845), p. 135.

‖ Peters. *Loc. cit.* 1860, p. 81.

¶ Boulenger. Cat. Snakes in Brit. Mus. 1893, I., pp. 11, 13.

** Boulenger. *Ibid*, pp. 35, 48.



TYPHLOPS PINGUIS, sp. nov.

Although examples showing the extreme degree of acuteness or roundness of the snout may be recognised, the collection exhibits so many intermediate grades that at present I feel inclined to regard the condition as of varietal rather than specific import. Should this view be ultimately maintained, the species will be known as *Typhlops australis*, Gray.

EXPLANATION OF PLATE III.

Fig.

1. Typhlops pinguis, *sp nov.* Nat. size.
2. Typhlops pinguis, head from above. Twice nat. size.
3. Typhlops pinguis, head from below. Twice nat. size.
4. Typhlops pinguis, head in profile. Twice nat. size.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 16th, 1897.]

Part XXI.

PECTINICORNES.

CERATOGNATHUS.

C. Frenchi, sp. nov. Mas. Minus elongatus, sat latus, sat parallelus; inæqualis; inæqualiter sat fortiter punctulatus; niger, squamis crassis albidis sparsim instructus, antennis picescentibus; capite medio tuberculo magno bifido et utrinque supra oculos cornu brevi sat acuto armato, oculis transversis minus convexis; mandibulis quam caput paullo longioribus, curvatis, ad apicem sursum compresso-dilatatis, margine apicali processu dentiformi sat elongato armatis; mento ut lamina erecta transversa posito, hoc sparsim grosse punctulato setoso (in medio haud canaliculato); prothorace transversim quadrato, antice haud angustato; elytris 3 vel 4 plus minusve distincte costatis; antennarum flabellis quam articuli ceteri conjuncti haud brevioribus. Long. (mands. excl.), 6 l.; lat., $2\frac{4}{5}$ l.

The form of the mentum (resembling the erect part of that organ in *Cryptodus caviceps*, Westw.) and the shape of the eyes are suggestive of close affinity between this insect and *C. mentifer*, Westw. I have not seen the latter but judging from the description of it the present species differs *inter alia* by the absence of a median tooth on the inner margin of the mandibles, by the strong erect process on the clypeus above each eye and by the form of the mentum which is neither sulcate down the middle nor emarginate at the apex.

Victorian Mountains; taken by Mr. Giles.

LAMELLICORNES *(Dynastides)*.

ISODON.

I. novitius, sp. nov. Mas. Brevis, subovatus; nitidus; brunneo-rufus, hic illic incerte infuscatus; clypeo antice modice (ut *I. pecuarii*) producto bidentato, ad latera nec acute nec extrorsum ultra oculos producto, crebrius rugulose (ut

reliquum capitis, basi summa excepta) punctulato, carina clypeali minus elevata recta haud tuberculata, lateribus sat fortiter sinuatis ; prothorace quam longiori paullo plus quam sesquilatiori, sparsim obsolete punctulato, antice vix impresso, basi marginata quam apex (hoc in medio tuberculato) fere duplo latiori, angulis anticis parum prominulis posticis rotundatis ; scutello lævi vel fere lævi ; elytris (stria subsuturali excepta) fere lævibus, striis punctulatis postice abbreviatis 2 vel 3 vix manifestis impressis ; propygidio stridulationis organis instructo (his rugis numerosis minus elevatis compositis) ; pygidio sat crebre punctulato, partibus mediana et postica fere lævibus ; tibiis anticis extus sat fortiter tridentatis ; tarsorum unguiculis simplicibus.

Fem. latet. Long., 5–6 l. ; lat., 3–3½ l.

A very distinct species that should stand in my tabulation (Tr. R.S. S.A., 1896, p. 237) beside *pecuarius* from which however it differs by many characters—*inter alia* the very fine and very sparse puncturation of its prothorax the elytra almost devoid of sculpture outside the subsutural stria, and the clypeus (as in *Australasiæ*, *terræ-reginæ*, and the species I take to be *curtus*, Burm., and *laticollis*, Burm.) not produced laterally in an angular projection protruding beyond the contour of the eyes.

W.A. ; Geraldton ; sent by Mr. Lea.

ASEMANTUS.

A. Leai, sp. nov. Minus latus, vix subovatus ; nitidus ; piceus (nonnullis exemplis plus minusve rufescentibus), subtus et in pedibus fulvo-hirtus ; sat convexus ; capite transversim sat crebre rugato, vix tuberculato, clypeo antice parum reflexo, carina inter frontem et clypeum modice distincta ; prothorace quam longiori paullo minus quam sesquilatiori, postice quam antice ut 1⅔ (vix) ad 1 latiori, antice excavatione parva leviter impressa (hac intus sat fortiter punctulata) et postice canaliculata (canali ut excavatio antica punctulato), subtilissime (antice crebrius postice sparsim) punctulato, lateribus minus rotundatis, angulis anticis acutis minus productis posticis obtusis ; scutello fere lævi ; elytris minus subtiliter sed sat leviter punctulatis, puncturis ut series 8 geminatim dispositis, interstitiis vix vel leviter convexis inter serierum paria ut series (sed confuse sparsim) punctulatis, parte apicali confuse crebre punctulata ; tarsis sat gracilibus minus brevibus ; pygidio plus minusve crebre (parte mediano-apicali quam ceteræ minus crebre punctulata vel lævi) punctulato.

Maris pygidio quam feminæ multo magis gibbo, tarsis posterioribus magis elongatis, unguiculis anticis inæqualibus.

Feminæ pygidio minus gibbo, tarsis posterioribus minus elongatis, unguiculis simplicibus. Long., 8–8½ l.; lat., 4½ l.

This species seems too close to *A. subæqualis* to be justifiably made into a new genus; nevertheless it differs in several not unimportant structural characters, notably in its longer and more slender tarsi (there being also a greater difference in length between the hind tarsi of the sexes, the basal joint of the hind tarsi being moreover but little dilated externally and not much more in the female than in the male). This is a perplexing character which makes *Asemantus* very difficult to place among the *Dynastid* genera, since in M. Lacordaire's arrangement the male of *A. subæqualis* would be a *Pentodontid* and the female a *Pimelopid* and both sexes of the present species have *Pentodontid* structure of the hind tarsi. Other characters in which this species differs slightly from the generic characters I attributed to *Asemantus* are as follows:—The carina separating the clypeus from the hinder part of the head is a little better defined than the expression "clypeus a fronte vix distinctus" implies, and the anterior excavation on the prothorax cannot be called "large."

Among the examples before me are two much smaller than the rest (long. 6 l.) which however do not seem to differ otherwise from the larger specimens.

W. Australia; Perth, Mount Barker, &c.; sent by Mr. Lea.

BUPRESTIDÆ.

STIGMODERA.

S. insularis, sp. nov. Sat lata; minus convexa; æneo-nigra, capite prothoraceque cyaneo- et viridi-nonnihil micantibus, scutello cyaneo, elytris testaceo-rufis (margines versus paullo magis læte rufis) sutura fasciis 2 (paullo ante et paullo pone medium positis) maculaque subquadrata apicali cyaneis, antennis pedibusque violaceis aureo-viridi-plus minusve micantibus; corpore subtus pilis erectis argenteo-cinereis vestito; capite longitudinaliter sat late excavato, antice sat fortiter minus crebre postice sat crebre minus fortiter punctulato; prothorace quam longiori (et postice quam antice) fere ut 1¾ ad 1 latiori, sat fortiter minus crebre (antice magis crebre magis subtiliter, ad latera crebre magis grosse) punctulato, in medio longitudinaliter late leviter impresso, latera versus depresso, lateribus sat arcuatis, latitudine majori pone medium posita, basi leviter sinuata; scutello sat lævi; elytris ad apicem leviter acuminatis (haud spinosis), punctulato-striatis, interstitiis convexis sparsim punctulatis; corpore subtus minus crebre minus fortiter (metasterno crebre fortius) punctulato. Long., 10 l.; lat., 4⅕ l.

The markings on the elytra consist of a very narrow basal border, a fascia in front of the middle resembling that of *S. simulata*, L. and G. (as figured Tr. Ent. Soc., Lond., 1868, t. 2, fig. 15), a fascia behind the middle resembling that of *S. præcellens*, Kerremans (widest on the suture and sinuously narrowed to the margin), a spot at the apex resembling that of *S. undulata*, L. and G. (as figured Tr. Ent. Soc., Lond., 1868, t. 2, fig. 20), and narrow dark coloring along the suture. In general form this species is very much like *S. cruenta*, L. and G., but is a little more depressed and wider with the sides of the prothorax very decidedly flattened out.

Tasmania; in the collection of C. French, Esq.

S. campestris, sp. nov. Minus lata; modice convexa; antennis capite prothoraceque æneis viridescentibus, scutello viridi, elytris brunneo-testaceis (basi summa, sutura, fascia postmediana, et apice nigro-violaceis), corpore subtus pedibusque cyaneis; capite antice sat producto, longitudinaliter sat profunde canaliculato, fortiter sat crebre punctulato, clypeo antice triangulariter exciso; prothorace quam longiori (et postice quam antice) ut $1\frac{3}{5}$ ad 1 latiori, fere ut caput punctulato, lateribus modice arcuatis, latitudine majori fere ad basin posita, basi sat fortiter bisinuata; scutello sparsim punctulato; elytris ad apicem late arcuatim emarginatis bispinosis, punctulato-striatis, interstitiis antice parum evidenter (postice gradatim fortius, apicem versus valde fortiter) convexis sat crebre minus fortiter punctulatis; corpore subtus subfortiter sat crebre (sternorum parte intercoxali sparsim sat subtiliter) punctulato. Long., $4\frac{4}{5}$ l.; lat., $1\frac{4}{5}$ l.

A species bearing much general resemblance to *S. distincta*, Saund. (as figured in Journ. Linn. Soc., 1868, t. 10, fig. 30), but differing in the suture being widely of blackish violet color. Differs from the description also in the prothorax being much less than twice as wide as long and its base much less than twice as wide as its apical margin, and in the sutural apex of the elytra being distinctly spiniform.

Queensland; sent by Mr. French.

S. Caroli, Blackb. Having seen reeently some more examples of *S. capucina*, Blackb., and discovered it to be a very variable species I have come to the conclusion that *S. Caroli* is probably an extreme variety of it. Unfortunately the description of *capucina* was founded on a then unique example in Mr. French's collection so that I had not a specimen before me when I described *Caroli*.

S. pulchripes, sp. nov. Modice lata; minus convexa; capite prothoraceque nigro-viridibus, elytris brunneo-testaceis,

horum basi summa sutura (late) fascia lata mox pone medium posita et parte apicali (late) nigro-viridibus vel subcyaneis, corpore subtus antennisque nigro-viridibus parce breviter argenteo-pubescentibus, pedibus læte violaceis; capite longitudinaliter profunde excavato, vix crebre minus fortiter punctulato; prothorace quam longiori ut $1\frac{3}{5}$ ad 1 latiori, sparsim (ad basin lateraque sat fortiter, in aliis partibus subtiliter) punctulato, ad latera in parte postica depresso, lateribus minus arcuatis, latitudine majori fere ad basin posita, basi minus fortiter sinuata; scutello lævi; elytris ad apicem tri-spinosis, punctulato-striatis, interstitiis (præsertim postice) sat fortiter carinatis fere lævibus; corpore subtus minus fortiter vix crebre punctulato. Long., 5–6 l.; lat., $1\frac{9}{10}$-$2\frac{1}{2}$ l.

Not unlike *S. campestris* in colors and markings, but with the post-median fascia of the elytra considerably wider; very different from it however in other respects. Its nearest ally is I think *S. bicincta*, Boisd., from which it differs *inter alia (a)* in markings, the suture being widely of dark color along its whole length and the basal dark coloring on the elytra consisting of a mere narrow edging; *(b)* in the prothorax (which is otherwise very like that of *S. bicincta*) being only very sparsely punctulate; *(c)* in the front of the elytra being very much less strongly arched forward. The structure of the apex of the elytra is as in *S. bicincta*—each apex trispinose, the two spines near the suture placed close together, the sutural spine the shortest of the three.

Victoria; sent by Mr. French.

S. undulata, Don. Mr. French's collection contains a remarkable variety of this insect in which the dark markings of the elytra are extended to cover the whole surface,—so that the elytra are of a uniform greenish-black color.

ELATERIDÆ.

MEGAPENTHES.

M. futilis, Cand. I have received under this name from Mr. Lea (who tells me that he obtained the name from Dr. Candèze) examples of the insect that I named *Elater wentworthensis*. It was to similar specimens, no doubt, that Dr. Candèze referred in the note appended to his original description of *M. futilis* (from N. Australia) when he said "I have had for some time several individuals from N.S. Wales lying unpublished (restès inédits) under the name of *futilis* and closely allied to it (ayant de grands rapports avec celui-ci)" and then mentioned its coloring, and said that it was also closely allied to *M. lituratus*. I am still of opinion that it is a good species. There are several specimens from tropical Australia in my collection which I regard

as *futilis* without doubt, and comparing *E. wentworthensis* with these I find that besides the strongly marked color distinctions the latter presents several slight differences; notably a somewhat finer and closer prothoracic puncturation and an evidently more marked sinuation of the hinder part of the lateral margins of that segment causing the hind angles to appear manifestly divaricate. It is also a consideration of some weight with one who has had experience in the collection of specimens in Australia that the probabilities are distinctly against the occurrence near Sydney (where I have taken *wentworthensis)* of species that are found in tropical Queensland. As regards the generic position of *wentworthensis* I accept Dr. Candèze's verdict. *Megapenthes* and *Elater* are (as indeed that learned author remarks in his "Mon. des *Elaterides*") very close, differing however in the prosternal sutures which are impressed in the latter genus and not in the former. In *wentworthensis* the sutures certainly appear less absolutely simple than in an average *Megapenthes*, but I think on re-examination they are not sufficiently concave to justify a place in *Elater;* in any case Dr. Candèze's authority may well determine the matter.

DASCYLLIDÆ.

MACROHELODES.

M. tasmanicus, sp. nov. Fem. Late ovalis; nitidus; supra glaber; subtus sat dense breviter sericeo-pubescens; supra flavo-brunneus (elytrorum partibus impressis quam ceteræ minus flavis), capite prothoraceque indeterminate piceo-notatis, elytris piceo-trimaculatis (maculis versus marginem lateralem prope basin prope mediam partem et pone medium positis), antennis palpisque versus apicem infuscatis; subtus (coxis exceptis) paullo infuscatus; capite (hoc inter oculos biimpresso) confertim sat subtiliter, prothorace sparsim leviter nec subtiliter, elytris crebre grosse, punctulatis; elytrorum sutura tota late leviter convexa sublævi; antennarum gracilium articulis 2° 3° que conjunctis quam 4us sat brevioribus. Long., $4\frac{1}{5}$ l.; lat., 3 l.

This species is much like *M. crassus*, Blackb., but can be at once distinguished from it by its more slender and differently formed antennæ. In *M. crassus* the joints beyond the third of the antennæ are evidently compressed and each evidently increases in width from its base to its apex (the width of the fifth joint at its apex being a trifle more than half its length). In the present species the joints of the antennæ are scarcely compressed at all, but very nearly cylindrical (the width of the fifth joint at its apex being not more than a third of its length). I may say that this character is specific not sexual inasmuch as I possess

both sexes of *M. crassus* and find that they present no notable difference except in the last ventral segment, which is feebly emarginate in the male and pointed (very obtusely) in the female. The present species also differs from *crassus* (apart from color) by its larger size and the evidently stronger puncturation of its prothorax.

Tasmania.

MALACODERMI.

LUCIOLA.

L. Cowleyi, sp. nov. Oblonga; supra nigra vel nigro-picea, prothorace (late) et elytris (magis anguste) ad latera testaceo-limbatis, scutello testaceo; corpore subtus (capite excepto) pedibus antennis (his paullo infuscatis) palpisque testaceis; segmento ventrali penultimo albo; capite concavo crebre punctulato; prothorace transversim quadrato, crebre punctulato, in medio longitudinaliter sulcato, antice in medio prominulo, lateribus sat late deplanatis, angulis anticis obtusis posticis rectis; elytris crebre aspere punctulatis, sutura et costis nonnullis elevatis. Long., $2\frac{1}{5}$—$2\frac{2}{5}$ l.; lat., 1 l.

Differs from *L. flavicollis*, Macl., by its smaller size, prothorax less narrowed behind and having the explanate sides wider, &c., from *L. coarcticollis*, Oliv., by smaller size, prothorax with sides much more explanate, lateral margins nearly straight, &c., from *australis*, Fab., by the blackish color of its prothorax (except the margins) and from *L. Gestroi*, Oliv., by the nearly straight sides of its prothorax, &c.

N. Queensland; sent by Mr. E. Cowley.

TENEBRIONIDÆ.

AXYNAON (gen. nov. *Meracanthidarum*).

Caput planum verticale, in coxas anticas reclive; clypeus utrinque supra antennarum basin sat gibbus; palporum articulus ultimus securiformis; labrum modicum; antennæ corporis dimidio longitudine sat æquales; prothorax sat parvus, fortiter convexus, sat gibbus, ad latera haud marginatus; scutellum transversum; elytra foveolato-striata; pedes sat graciles sat elongati, femoribus inermibus, tibiis ad apicem mucronibus binis armatis; metasternum brevissimum.

*No Australian species of *Meracanthides* has been described

*I have submitted an example of this insect to Mr. G. C. Champion, the eminent specialist on the *Heteromera*, and he, with his accustomed courtesy, has favored me with his opinion. He says "the insect is either an aberrant *Meracanthid* or should form the type of a new group. Your supposition regarding its affinities is quite correct. It differs from the *Meracanthides* in precisely the same way that the *Megacanthides* differ from the *Amarygmides*, viz., in the unarmed anterior femora. In some respects, as regards the scutellum, &c., it is more like *Psorodes* than *Meracantha*."

hitherto. The present insect is certainly I think referable to the tribe, though it cannot be placed in any known genus. I have not an example in my collection of either of the two genera (the African *Psorodes* and the N. American *Meracantha*) on which M. Lacordaire founded the tribe, and so cannot very confidently remark on the affinities of the genus I am characterising, but I judge it to be not very near either of the two, as it evidently differs from them by its femora without teeth and its prothorax without lateral carinæ. In general appearance it resembles a *Chalcopterus* but is at once distinguishable from that genus by its very short metasternum.

A. Championi, sp. nov. Æneus (exemplis nonnullis viridi- vel cupreo-micantibus); capite inter oculos crebre aspere punctulato; prothorace subtiliter minus perspicue punctulato, transverso, antice supra caput (a latere viso) fortiter declivi, lateribus haud marginatis; scutello lævi brevi; elytris grosse seriatim foveolatis, interstitiis angustis convexis. Long., 8 l.; lat., 4 l.

N. Queensland; sent by Mr. French.

CURCULIONIDÆ.

CAR (gen. nov.; ? *Erirhininarum*).

Corpus pubescens; rostrum prothorace sat longius, minus robustum, subcylindricum, leviter arcuatum; scrobes breves subbasales inferæ; antennæ fere rectæ (vix geniculatæ), ad basin fere contiguæ, scapo brevi, clava a funiculo vix distincta (hujus quam funiculi articulis inter se haud magis arcte conjunctis); oculi valde leviter sed minus subtiliter granulati; prothorax, subcylindricus sed antice angustatus, quam elytra sat angustior, lobis ocularibus nullis; scutellum modicum; elytra sat lata; prosternum ante coxas minus elongatum; coxæ anticæ contiguæ, intermediæ modice approximatæ; femora mutica; tibiæ validæ, apice apertæ inermes; tarsi modici, articulo 3° alte bilobo; unguiculi divaricati intus sinuati; pygidium elytris tectum; segmentum ventrale 2um quam 1um multo brevius, quam 3um parum longius; segmenta intermedia ad latera vix angulata; metasternum modicum.

The small *Curculionid* for which I propose this new generic name is a most perplexing species and difficult to place in any of M. Lacordaire's "Tribes." There is no doubt of its appertaining to the aggregate which M. Lacordaire calls "Section B of Phalanx I. of the Curculionides Phanerognathes Synmerides." On first consideration it seems to appertain to that portion of the said "Section" in which the antennæ are straight and have no

distinct club and to be referable to the *Belides;* but as it has no other resemblance to those genera, being in general appearance as unlike a *Belid* as it can well be, it does not seem at all satisfactory to give it such a place. The idea of its being a *Belid* once laid aside, the general resemblance to *Erirhininæ* must certainly strike the attention, and subsequent consideration cannot fail I think to indicate those latter as really being the tribe of which the present insect is an aberrant member. Regarding it as such I do not find any aberration except in the antennæ which undoubtedly are very unlike those of a typical *Erirhinid:* nevertheless even these when carefully observed are found to differ in degree rather than fundamentally,—for the basal joint (though not longer than the following two joints together) is evidently a "scape," and the joints following it do not uninterruptedly (as they do in *Belus)* continue the direction of the basal joint but are feebly geniculate with it. Perhaps however the greatest divergence from the *Erirhinid* type is in the antennæ not having a defined club but terminating quite like those of a *Belus;* yet even this character is distantly approximated in *Eniopea.* The *position* of the antennæ (inserted on the underside of the base of the rostrum and separated only by a narrow canthus) does not appear to be more inconsistent with the *Erirhininæ* than with any other Tribe that I can suggest for this species to be placed in;—so that on the whole I feel fairly confident that I am placing it rightly. Its claws scarcely differ from those of an *Emplesis.* The prothorax and elytra in outline much resemble those of *Rhynchites betuleti,* F., except in the prothorax being more conico-cylindric. The basal two segments of the abdomen separated by a well-defined suture and the presence of a good-sized scutellum and the absence of an antennal club separate the present species from *Apion* and its allies as characterised by Lacordaire.

C. condensatus, sp. nov. Fem. (?). Tota rufo-brunnea, pilis brevibus dilutioribus inæqualiter vestitus, his in elytro utroque ut lunula magna indeterminata condensatis (cujus apices in margine laterali positi sunt); rostro gracili, cylindrico, leviter arcuato, quam prothorax sat longiori, subtiliter sparsim punctulato; antennarum scapo articulis sequentibus 2 conjunctis longitudine sat æquali, funiculi articulis 1° quam 2us et 2° quam 3us paullo brevioribus, 3°—5° inter se sat æqualibus, 6° 7° que paullo brevioribus; prothorace vix transverso, crebre fortiter sat rugulose punctulato; elytris punctulato-striatis, interstitiis leviter convexis crebre subrugulose punctulatis. Long. (rostr. excl.), $2\frac{1}{2}$ l.; lat, $1\frac{3}{5}$ l.

Australia; exact habitat uncertain, but I believe it to be in Eyre's Peninsula.

ELLESCHODES (gen. nov. *Tychiidarum*).

Corpus pubescens; rostrum prothorace vix longius, sat robustum, subdepressum; scrobes antemedianæ subrostrum directæ, oculos attingentes; funiculus 7-articulatus; oculi subfortiter granulati; prothorax transversus, quam elytra haud multo angustior, lobis ocularibus fere nullis; scutellum sat parvum; elytra brevia, lata; prosternum ante coxas minus breve; coxæ intermediæ minus approximatæ; femora dente parvo armata; tibiæ sat validæ, anterioribus breviter mucronatis; tarsi sat breves, articulo 3° alte bilobo; unguiculi divaricati, appendiculati; pygidium elytris tectum; segmentum ventrale 2um quam 1um paullo brevius, quam 3um 4um que conjuncta sublongius; segmenta intermedia ad latera fortiter angulata, 2° 3um haud amplectenti.

In M. Lacordaire's classification this genus falls into the Group *Elleschides* and is very near *Elleschus* from which *inter alia* its strongly divaricate claws distinguish it. Its dentate femora *inter alia* distinguish it from *Orichora* and *Ochrophœbe*.

E. Hamiltoni, sp. nov. Ferrugineus vel piceo-ferrugineus, rostro pedibus sternisque nigricantibus; rostro supra longitudinaliter striolato; antennis minus elongatis, scapo oculum attingenti, funiculi articulo 1° modice elongato ceteris brevibus, clava manifeste articulata; capite prothoraceque crebre vix fortiter punctulatis; hoc sat transverso, antice subito angustato, in medio longitudinaliter plus minusve perspicue subcarinato; elytris vix striatis, seriatim subgrosse (interstitiis planis crebre subtiliter) punctulatis; corpore breviter pubescenti. Long. (rostr. exc.), $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

Perhaps congeneric with *Elleschus orbitalis*, Schönnh., which its author places in *Elleschus* with some hesitation, but differing from the description of that species *inter alia* by the absence of white pilosity on the orbits of the eyes and on the sterna.

N.S. Wales; taken near Mount Kembla by A. G. Hamilton, Esq., who is publishing (in Linn. Soc. N.S.W.) a paper on the economic value of this species.

LONGICORNES.

NENENIA.

The following two species may I think be confidently referred to *Nenenia* with which they seem to agree in all generic characters.

N. thoracica, sp. nov. Sat elongata; sat parallela; nigra, capite subtus genis et prothorace rufo-testaceis, elytris chalybeis notula subapicali transversa testacea (hac in margine laterali

quam in sutura multo latiori) ornatis, antennis apicem versus subferrugineis; pedibus piceis. Long., $5\frac{1}{2}$ l.; lat., $1\frac{1}{2}$ l.

The structure of the head mouth organs and antennæ does not differ from the same in *N. aurulenta*, Pasc.; the elytra are more parallel more distinctly punctured and scarcely distinctly pubescent; the tarsi are distinctly (though not very much) more slender. I do not observe any other notable structural difference from *N. aurulenta*, Pasc., but the difference in coloring prevents any possibility of confusing the two species. The subapical fascia of the elytra commences on the lateral margin about half-way between the middle and the apex and continues there more than half-way to the apex; its front margin runs obliquely hindward to a point a little behind the middle of its lateral margin; its hind margin is on the suture about level with its lateral hind margin but its hind margin is deeply roundly emarginate so that the chalybeate apex has the appearance of a round spot.

Victoria; sent by Mr. Sloane; also by Mr. French.

N. virgata, sp. nov. Elongata; parallela; pallida (subtus obscura flavo-pubescens); capite, prothoraceque maculatim, elytris longitudinaliter adque apicem antennis, et femorum tibiarum tarsorumque parte apicali, nigro-vel piceo-notatis. Long., 5 l.; lat., $1\frac{1}{5}$ l.

Evidently a variable species in the distinctness of its markings, as the two specimens I have seen differ considerably in this respect. Regarding pale yellow as the ground color of the upper surface the dark markings are as follows:—a large space between the eyes, a spot on the vertex, the middle of the front of the prothorax and two large discal spots on the same, the scutellum (which however is clothed with pale pubescence), and on the elytra the suture (widely but not quite to the apex) a narrow interrupted marginal vitta and an apical spot. In one of the examples before me the sutural vitta is subobsolete and the marginal vitta quite faint, while the space between the apical spot and the elytral vittæ is more brightly yellow than the rest of the surface so that it seems to bear a rather conspicuous fascia. This species is evidently more narrow and parallel than the preceding; the fine cariniform lines on the elytra are less marked than in it or *N. aurulenta*.

N. Queensland; sent by Mr. French.

RHYTIPHORA.

R. Spenceri, sp. nov. Piceo-nigra, pilis niveis variegata; his frontem totam genasque dense æqualiter vestientibus, in vertice (hoc longitudinaliter impresso) tri-radiatim co nden satis, in prothorace lineas transversas plus minusve inter

ruptas 4 vel 5 formantibus, in elytris ut lineæ varie contortæ maculæque condensatis, corpus subtus pedesque dense sat æqualiter (nihilo minus hic illic, præsertim in metasterno et abdominis lateribus interrupte) et antennarum articulos 2um—8um ad basin vestientibus; oculis permagnis; capite prothoraceque irregulariter sat sparsim vix profunde punctulato; hoc transversim subquadrato, transversim plicato; elytris fere ut prothorax punctulatis, granulis nonnullis basin versus instructis, ad apicem rotundatim vix truncatis. Long. 14–16 l.; lat., 5–5½ l.

Closely allied to *R. (Penthea) Saundersi*, Pasc., but differing from it by its very much larger eyes, the space between which is densely clothed with even white pubescence, the spots and patches of pubescence on its elytra considerably larger though of similar form and arrangement, and its narrower and more elongate form. The antennæ of the male are a trifle longer (of the female a trifle shorter) than the body. I take the essential distinction of *Rhytiphora* from *Penthea* to lie in the less fine granulation of the eyes; tested by that character this species and *Saundersi*, Pasc., appertain to *Rhytiphora*.

Central Australia; taken by Professor Spencer; sent to me by Mr. French.

Critical Remarks on Some Australian Mollusca.

By Professor Ralph Tate.

[Read May 4, 1897.]

I availed myself of the opportunity during my recent visit to Europe to compare actual South Australian specimens taken with me with the types of certain Australian species preserved in National Museums of Paris and London.

The Musée de l'Histoire Naturelle at Paris contains some of the Lamarckian types collected by the Baudin-expedition on the southern coasts of Australia, and some of those described and figured by Quoy and Gaimard in the "Zoologie de l'Astrolabe," collected at King George Sound, Western Port, and Hobart. The British Museum, London, contains the celebrated Cumingian collections, many of the Australian species of which are figured in Reeve's Icon. Conchol.; and types or co-types of species collected by Angas, and described by himself, or in conjunction with A. Adams, and by Crosse.

I need not rehearse the many disappointments which I experienced. But what authentic informations I have been able to glean are set forth in the following pages. Doubtless many of the synonymns herein indicated have already been established, but the independent opinion of an Australian conchologist on Australian shells may be worthy of record, even if it be only in conformation of prior determinations. Exchanges of opinions between Australian collectors and Mr. E. A. Smith, of the British Museum, and other conchologists having access thereto, cover a period at least of 20 years, and we have profited thereby, chiefly as regards the larger forms; but the National collection inadequately illustrates the molluscan fauna of Australia.

PART I.—GASTEROPODA.

Triton exaratus, T. Quoyi, T. verrucosus, and T. eburneus, all of Reeve !, are correctly identified.

Fusus ustulatus, Reeve !, is correctly identified.

Cominella filicea, Crosse !. I have of this species specimens now identified with the type from Newcastle, N.S.W., and N.E. coast of Queensland. So far as I know, the species has not been taken here by local collectors, and I suspect that Angas's record of a single find is an importation, the locality of the type being

Port Jackson, to which on the label has been added "S. Australia."

Cominella Adelaidensis, Crosse !, is not separable specifically from C. ALVEOLATA. It may, however, be regarded as a local race.

COLUMBELLA SEMICONVEXA, Lamarck !, is correctly identified. *C. Yorkensis*, Crosse !, is a unicolorous variety, and *C. infumata*, Crosse !, is a mere micromorph.

ANCILLARIA MARGINATA, Lamarck !, is rightly named.

Cancellaria lævigata, Sowerby !, v. *C. purpuræformis*, Valenc. The type-specimens of the former are somewhat rolled, but one large one is without costation. The British Musuem examples of the latter are smaller, spirally lineated, and the spire-whorls not costate. The absence or presence of costation on the posterior whorls is thus not constant, and the absence of spiral striation in *C. lævigata* may be due to obliteration by erosion. I regard the two as conspecific, and would employ the name C. PURPURÆFORMIS as the anterior of the two.

NATICA UMBILICATA, Quoy and Gaimard !, and *Natina picta*, Reeve !, are conspecific, as already suspected. The shell may be located in the subgenus *Stigmaulax*, Mörch, 1852, of *Natica ;* whilst *Naticina nitida*, Reeve, another South Australian shell, becomes a *Eunaticina*, Fischer, 1885—*Naticina*, Gray, 1842 (non Guilding, 1834).

THYLACODES SULCATUS, Lamarck.

The South Australian vermitiform shell, thus named, agrees with the type of *Serpula sulcata*, Lamk., and *S. sipho* of that author is the same ; *Vermetus arenarius*, Q. and G. ! (non. Lk.) is another synonym.

Tryon (Man. Conch., VIII., p. 179, t. 53, f. 64, 1886) rejects the Lamarckian name in favour of *V. novæ Hollandiæ*, Rousseau, because "one of the three types of that species [*S. sulcata*] is a fossil and different, the other two appear to be *V. sipho*." From a personal inspection, I assert with confidence that the above statement is not true ; *S. sulcata* and *S. sipho* are separately labelled, though I regard them as one species ; it is true Lamarck adds a note under *S. sulcata*, "se trouve fossile dans la Touraine," but the fossil is not among the recent types. I regret not being able to consult Vaillant's paper.

The animal of our common tubiculate gasteropod exhibits the same characters as described by Quoy and Gaimard for their *V. arenarius*. But I may add that the oval egg-cases to the number of 50 or 60 are attached by glutinous threads to inner shell-wall ; about 20 matured embryos are contained in each capsule.

TURRITELLA OXYACRIS, Tate, *nom. mut.*

T. acuta, Tenison-Woods, 1876 (non Mayer, 1868).

Eulima agur, Angas ! is correctly named.

Diastoma melanoides [Reeve], Tate, Jour. Roy. Soc. N.S.W., vol. XXVII., p. 176, 1893.

Mesalia melanoides, Reeve, Icon. Conch., 1849.

Ataxocerithium serotinum (A. Ads.), Tate, J. Roy. Soc., N.S.W., vol. XXVII., p. 179, 1893. This species I have made the type of a new genus.

Batillaria Cerithium, Q. and G.

Turritella Cerithium, Quoy and Gaimard !, Voy. Astrolabe, p. 131, t. 55, f. 27-28.

Cerithium turritella, Menke, Moll. Nov. Holl., p. 19 (non Q. and G.).

Bittium turritella, Angas, P.Z.S., 1865, p. 171 ; *id.* Ten.-Woods, P. Roy. Soc. Tasm., 1878, p. 35.

Cerithidea turritella, Tryon, Man. Conch.

Quoy and Gaimard's types which I have studied were obtained at Port Western, Victoria ; the species is very common in Tasmania and South Australia ; it inhabits the mud-flats in the region of about half-tide. Its operculum is circular and many whorled.

This shell has been misquoted by Menke and subsequent authors, which is traceable to a confusion of Quoy and Gaimard's own creation ; thus they describe and figure a shell from Port Dorey in Papua as *Cerithium turritella* (t. 55, f. 8), whilst the Victorian shell is called *Turritella cerithium*. The Southern shell is the latter, and it extends to West Australia, if my quotation of Menke is right, who, however, mentions only the name, but adds a reference to Kiener, Icon. p. 64, t. 22, f. 1, which I cannot consult.

The generic name *Batillaria*, Benson, 1842, replaces *Lampania*, proposed four years after by Gray.

Triforis Angasi, Crosse !, is rightly identified.

Diala monile, A. Adams !, is rightly identified, though the types are immature ; *T. tessellata*, Ten.-Woods !, better exemplifies the species than the commoner form in South Australian waters.

Diala lauta, Adams !, is rightly identified.

Littorina Mauritiana, Lamarck. The smaller and rotund variety, which lives at the high-water-mark is *L. Diemensis*, Quoy and Gaimard !.

Paludinella Gilesii, Angas !, P.Z.S., 1877, t. 26, f. 2, 171, was redescribed by me, Trans. Roy. Soc. S. Aust., vol. XVI., p. 196, under the name of *Blandfordia Stirlingi*, an excusable oversight on account of the faulty figure, which better represents *Bithynia australis*. The present species may be quoted as Blandfordia Gilesii.

Melania Balonnensis, Conrad. In the Zoology of the Horn

Expedition I have degraded the two following Melaniæ, *M. Tatei*, Brazier, and *M. subsmilis*, E. A. Smith !, to varietal rank.

Cyclostrema cingulifera, A. Adams !, This Philippine shell is very much larger than *C. Tatei*, Angas, but otherwise they seem identical, in which case *C. lævis*, Phil., will fall in as another synonym.

Cyclostrema micans, A. Adams !, and *Liotia Angasi*, Crosse !, are the same by comparison of types. Adams located his species in the right genus, and his name takes priority.

Phasianella variegata, Lamark !, and *P. Angasi*, Crosse !, are conspecific ; Crosse's type is a somewhat overgrown individual, but otherwise not different from the Lamarckian type.

Clanculus Yatesi, Crosse !, October, 1863 = *C. Menkei*, Ads. and Angas, in British Museum.

Monodonta lineata, Lamk. ! = Trochus badius, Wood.

This admission is on the back of the tablet carrying Lamarck's types, to which is added *M. rosea*, Lamk. ! *M. Peroni*, Lamarck, only differs by having white flames.

These and other congeneric species usually referred to *Elenchus* should be quoted under *Phasianotrochus*, Fischer.

Cantharidus decoratus, Adams and Angas !, P.Z.S., 1864, and *Trochus Tiberianus*, Crosse !, Jour. de Conch., Oct., 1863, are the same as already suspected, and referred as synonymic under *Gibbula smaltata*, Fischer, 1879. Crosse's name is the older, and the shell should be quoted as Gibbula Tiberiana. *G. aurea*, Ten.-Woods (1876) is another synonym.

Gena nigra, Q. and G., was not seen in the Paris Museum, but a shell identically that which is locally referred to that species is present, though unnamed.

Fissurella nigrita, Sowerby !; is rightly identified ; the types are larger than *F. Pritchardi*, Hedley, which I regard as synonymic.

Parmophorus convexus, Q. and G.!=*P. australis*, Lk.!=Scutus anatinus, Donovan.

Acmaea flammea, Q. and G.! *(Patelloidea)*. This species has hitherto been known to local conchologists as *A. conoidea*, Q. and G., Angas in 1865 being the first in error. The types are worn smooth externally, and show a cruciform coloration in brown ; each flame is frequently broken-up into three or more streaks.

Acmaea conoidea, Q. and G.!, which is much smaller than *A. flammea*, has a circular aperture and fine radial threads. *A. calamus*, Crosse and Fischer, authentic specimens of which I have not seen, is probably the same.

Acmaea septiformis, Q. and G.!, is rightly identified.

Bullinella arachis, Q. and G.!, is rightly identified.

Haminea cymbalum, Q. and G. The type of this species I have

not seen, but specimens so named in the Museum of the École des Mines at Paris are different from those quoted under that name by Angas in 1865. Our shell is H. TENERA, A. Ads.

PART II.—LAMELLIBRANCHIATA.

The communication under this head will constitute a Fourth Supplementary List of the Lamellibranch Mollusca of South Australia. The first revision was published in Trans. Roy. Soc., S. Aust., vol. ix., pp. 76-111, 1887, and Supplemental Lists in vol. X., 1888, vol. XIV., 1891, and vol. XV., 1892.

TEREDO ADAX, Hedley, P. Lin. Soc., N.S.W., 1895. This species, though unnamed, was recorded by me Revision ix., p. 19, 1887.

Barnea similis [Gray], Tate, op. cit. ix, p. 80, non Gray=B. OBTURAMENTUM, Hedley, Records Austr. Mus., II., p. 55, t. 14, 1893.

SAXICAVA ARCTICA, Linnæus. *Saxicava veneriformis*, Lamk.!, and *Corbula australis*, Lamarck!, are the same, both types equally large.

GENUS CUSPIDARIA.

CUSPIDARIA TASMANICA, Tenison-Woods (Neaera), Proc. Roy. Soc., Tasmania, for 1875, p. 27 (1876).

Mr. E. A. Smith, in the Lamellibranchs of the Challenger Expedition, characterises 13 sections of the genus Neaera, denominated A to M. The dentition of the species here noticed was unknown to him, which desiderrated information I now furnish. It indicates a disposition of the hinge-teeth different from that of each one of Smith's sections, and a new section is required to receive it. The diagnosis is as follows:—

Section N.

Right valve with a lateral tooth on each side; left valve with a single tubercular denticle in front of the apex, no laterals. This arrangement approximates to that in Section F., but without the denticle in front of the apex of the right valve.

C. Tasmanica inhabits the south-east coats of Tasmania and St. Vincent-Gulf, South Australia.

CUSPIDARIA SIMULANS, Tate, 1897.

Oblong-oval, somewhat ventricose, white, thin, translucent, concentrically and distantly lirate; liræ usually rounded and elevated, becoming somewhat lamellose anteriorly, sometimes as close-set and slightly elevated lamellæ. Some examples show distant radial pellucid lines. The rostrum is elongated, about one-fifth of the total antero-posterior diameter, attenuated and truncate.

Right valve with a long lamelliform tooth on each side; left valve edentulous; cartilage-pit posteriorly inclined.

Antero-posterior diameter, 6·5; umbo-ventral diameter, 4; transverse diameter, 2·25.

Habitat.—St. Vincent Gulf, numerous examples dredged by Dr. Verco.

Affinities.—The dentition is that proper to *Rhinomya*, Adams, =Section G., Smith. Hitherto this section has been unrepresented in the Australian fauna, as the *R. rugata* recorded by Angas is not the species of Adams; it belongs to Section F, and has been described by Smith as *C. Brazieri*.

In form and sculpture it resembles *C. Brazieri*, except that the rostrum is shorter (perhaps not a constant character). This general resemblance renders it doubtful if the South Australian shell is distinct from *Rhinomya rugata*, Adams, inhabiting Japan, except that "oblonga," "concentrice confertim lirata," and "liris corrugates" do not well apply.

CUSPIDARIA TRIGONALIS, Tate, 1897.

Subtrigonous, produced posteriorly into a short triangular rostrum; ventricose, white, ornamented with concentric lamellæ; the lamellæ of the left valve are distant, thin, elevated, wider than the interstitial sulci; those of the right valve depressed and separated by lincar sulci.

Right valve with a lamellar tooth on each side, left valve with a stout denticle in front of the hinge-notch; cartilage-pit deep and subtriangular in outline.

Antero-post. diameter 5·5, excl. rostrum 4·25; umbo-ventral diameter 4, transverse diameter 4.

Habitat.—Investigator Straits, dredged in 15 fathoms by Dr. J. Verco.

Remarks.—Of the four known examples, three are left valves and one is a right valve; they have the same shape, but as the ornamentation of the opposite valves is different it is possible that two species are represented; yet there is nothing incompatible to the opinion that the difference of ornamentation is one of degree, though it may be, we have here a species with the opposite valves dissimilarly ornamented.

The dentition of *C. trigonulis* is that of Section N., established for *C. Tasmanica*, from which species it differs by its conspicuous cardinal denticle, shape and ventricosity, and thus also from *C. simulans*. Indeed, it is remarkable among congeners by its subtrigonal outline and umbonal inflation.

CORBULA COMPRESSA, Verco, Tr. Roy. Soc., S. Aust., XX. p. 230, t. 8, f. 2, 1896.

Myodora corrugata, *Verco*, op. cit. p. 229, t. 8, f. 1, 1896 (non

Tate, 1887) = MYODORA ALBIDA, Ten.-Woods. St. Vincent and Spencer Gulfs ; also Tasmania.

MACTRA RUFESCENS, Lamarck. Correctly identified according to the British Museum record.

Hemimactra corrugata, Tate, is only a varietal form of *H. versicolor*, Tate.

HEMIMACTRA OVALINA, Lamarck. Correctly identified apud British Museum, where *Mactra depressa*, Reeve, non Spengler, is admitted a synonym.

LUTRARIA OBLONGA [Gmelin], Tate, op. cit., XIV., p. 266. If the South Australian shell should be considered separable from the European, bearing the above name, then *L. rhynchæna*, Reeve !, which is identically our shell, should be substituted. *L. dissimilis*, Deshayes, was not seen.

MESODESMA GLABRELLA, Lamarck. The types of *Amphidesma glabrella*, Lk. !, *Mesodesma præcisa*, Deshayes !, and *M. obtusa*, Crosse !, have been compared, and found to be conspecific ; the two latter had already been considered by me, op. cit. IX., p. 85, as the same.

MESODESMA ELONGATA, Desh. This shell occurs in the Paris Museum as a Mactra with an undecipherable specific name. The types of *M. elongata* and *M. angusta*, Desh., which are in the British Museum, belong to one species.

ANAPELLA CUNEATA, Lamarck sp. *Anapa cuneata* et *A. triquetra*. These two species of South Australian Anapas were admitted by me, op. cit., IX., p. 86, but after the study of the types of Lamarck and Hanley, I have come to the conclusion that only one species is represented, which finds support in the fact that the two variants are correlative with their habitats, the typical form on the sea-coast, and the Hanleyan form in estuaries. *Crassatella cycladea*, Lk., is another synonymn from my examination of the type. This species should be quoted under *Anapella*, Dall, 1895, in substitution for *Anapa*, Gray, 1853, non Gray, 1847.

Mulinia pinguis, C. and F., after a careful study of the description and figures of those authors, I cannot escape from the conviction that their shell is a monstrosity of *Anapella cuneata* forma *triquetra*. The generic location is made clear by the figure which displays the interior of the right valve.

Donax sordida, Angas ! (non Hanley)=D. BRAZIERI, Smith !, 1872.

PSAMMOBIA ZONALIS, Lamarck !, id. Tate, op cit., IX., p. 87, is rightly identified.

CHORISTODON LAPICIDUM, Chem. Of the two synonymic names *Naranio lapicida* and *N. divaricata*, both of Chemnitz, I follow the British Museum authorities in using the former.

CHORISTODON RUBIGINOSUM, Adams and Angas.

Clementia Tasmanica, Petterd !, is a synonym.

VENURUPIS CARDITOIDES and V. CRENATA, Lamarck, are rightly identified according to the British Museum naming.

TAPES FABAGELLA, Deshayes, of my collection agrees with the type in the British Museum.

CHIONE GALLINULA, Lamarck, as so named from South Australian waters, agrees with the type. VENUS AUSTRALIS, Sow., is perhaps not the same species, the type specimens have finer and closer concentric ribs than the type of *V. gallinula*, whilst in outline it is more triangular, the post-ventral margin rising more quickly.

The locality of Lamarck's type is King Island, that of Sowerby's King George Sound.

C. australis has not been found in South Australian waters.

CHIONE PERONI, Lamarck !, with which *C. aphrodinoides !* should be united. *C. conularis !* may be the young state. This species in my Revision, IX., p. 92, is quoted as *C. scalarina*. Reeve, in Mon. Venus, gives an excellent figure of it (t. 17, f. 73) under the name of *C. aphrodinoides*.

CHIONE STRIGOSA, Lamarck !. *C. aphrodina*, Lk., is obviously from descriptions and figures a synonym. In my Revision the species is quoted as *C. aphrodina*.

Chione sp. unnamed. The shell incorrectly referred in my Revision, IX., p. 92, No. 67, to *C. strigosa*, I failed to identify in either the Paris or British Museum. It may possibly be *C. scalarina*, Lamk., which I have not seen, or any examples attributed to it. It agrees very fairly well in outline with Reeve's figure of it, which represents a shell of medium size, particularly in the somewhat arched post-hinge line, but no description of *C. scalarina* alludes to the very distinctive ornamentation of our shell.

DOSINIA DIANA, Adams and Angas, id Tate, op. cit., IX., p. 93.

The type of this species and the shell I figured as *D. grata* are certainly the same, but they are different from *D. grata*. *D. diana* appears as if it were a worn *D. crocea* without the coloration on the escutcheon. *D. crocea* is slightly coarser ribbed, and more depressed than *D. diana*.

Dosinia crocea, Deshayes. This is a wrong identification, but it agrees with *D. histrio*, var. from Swan River, in the British Museum. It has the concentric ribs coarser and wider apart than in *D. grata*.

MERETRIX ALATUS, Reeve. This is in substitution for *Cytherea rutila*, Sow., and in harmony with the British Museum record. *M. rutilus* is a different species.

Meretrix multistriatus, as quoted from Tasmania, can only be

M. DIEMENENSIS; the true *M. multistriatus* is a very different shell; and Hutton's record of *M. disruptus* for the Wanganui-Pliocene relates to *M. multistriatus*. *M. disruptus* is sufficiently distinct from *M. Diemenensis* to take specific rank. The generic name *Cytherea*, Lamarck, is replaced by *Meretrix*.

CYPRICARDIA ROSTRATA, Lk. !, which is attributed to Kangaroo Island, is labelled in the Paris Museum with the locality of New Holland.

LUCINA LACTEOLA, Tate, *nom. mut.*

L. lactea, A. Adams, non Lamarck.

L. concentrica, Adams and Angas, 1863, non Lamarck.

The British Museum records show that *L. lactea* has precedence over *L. concentrica*, and that the two names refer to the one species, but as the employment of either names has previously been in use and continues so, it becomes necessary to affix a new specific denomination.

AXINUS FLEXUOSUS, Montague. A British species now known in New South Wales (Brazier), Tasmania (Petterd ! and May !), and South Australia, St. Vincent Gulf (Dr. Verco !).

LUCINA MINIMA, Ten.-Woods !, Proc. Roy. Soc. Tasmania for 1875, p. 162 (1876), antedates *L. Tatei*, Angas, by two years.

LUCINA CUMINGI, Adams and Angas. This Divaricella may not be *L. quadrisulcata*, D'Orbigny, and if the distinction is valid, then *L. Cumingi* comes to be employed for the Australasian shell.

CRASSATELLA MICRA, Verco, Trans. Roy. Soc. S. Aust., vol. XIX., pl. i., f. 3.

CRASSATELLA PRODUCTA, Verco, op. cit., pl. i, f. 2.

MYTILICARDIA CRASSICOSTATA, Lamarck ! (Cardita), is rightly identified by comparison with the type.

BARBATIA CARPENTERI.

The following are additional synonyms :—*Arca trapezia* and *A. fasciata*, Ten.-Woods in Hobart Museum.

Barbatia laminata, Angas !, is a mere synonym to B. SQUAMOSA, Lamarck !, as also *A. McCoyi*, Ten.-Woods.

AXINÆA RADIANS, Lamarck *(Pectunculus) !*. *Pectunculus obliquus*, Reeve !, is a synonym, and moreover the specific name is preoccupied by Defrance, 1826, and Lea, 1833.

AXINÆA STRIATULARIS, Lamarck *(Pectunculus) !* This is the same as *P. radians* of my "Revision," IX., p. 103. The type is from King George Sound; the examples in the British Museum are labelled from Swan River.

LIMOPSIS FORSKALI, Adams !. The *Limopsis Belcheri* of my Revision, IX., p. 104, wherein I had adopted McCoy's identification, is certainly not that species !. It approaches best to *L. Forskali*, but whether *L. Macgillivrayi* be the more appropriate designation I cannot say, not having seen that species.

MYTILUS HIRSUTUS, Lamarck. The actual type not seen, but is correctly identified from specimens so named in Paris Museum.

MYTILUS MENKEANUS, Philippi. This species was known to Lamarck, and is his *Magellanicus*, var.!, as it is also *M. polydontes*, Q. and G.!

MYTILUS PLANULATUS, Lamarck! This is *M. chorus* of my Revision, IX., p. 105. Lamarck's type! is from King George Sound. The subordination of the name of this species to that of *M. chorus*, Molinia, I have no opinion upon, having accepted Hutton's views thereon.

MODIOLA AUSTRALIS, Gray. This is also *M. albicosta*, var. *spatula*, Lamarck!

MODIOLA ALBICOSTA, Lamarck! The type is artificially polished, but our shell so named is correctly identified.

MODIOLA INCONSTANS, Dunker, so named in the British Museum, is the same which I figured in my Revision, IX., under the name of *M. semivestita*, Dunker.

MODIOLA FLAVIDA, Dunker, so named in the British Museum, is No. 181 of my Hand List, published by Adcock (1893).

MODIOLARIA CUMINGIANA, Reeve. A synonym of this species is *M. discors*, Q. and G.!, on the opinion that the Australasian is distinct from the European.

MALLEUS VULSELLATUS, Lamarck!, is correctly named in our local list. The following Lamarckian species seem to me to be mere variants:—*M. decurtatus!* is a stunted form, and *M. normalis!* is only a little more winged than *M. vulsellatus*.

VULSELLA OVATA, Lamarck! The types are large examples, with an individuality of a more defined concentric sculpture than is usual with South Australian examples attributed to that species.

AVICULA PAPILIONACEA (Chemnitz), Lamarck! As suspected in my Revision, IX., p. 107, *A. Georgiana*, Q. and G. proves to be the same; and examination of Reeve's types in the British Museum results in attaching the two following as synonyms:—*A. punctulata* and *A. scalpta*.

Descriptions of New Australian Lepidoptera.

By Oswald Lower, F.E.S., &c.

[Read April 6, 1897.]

BOMBYCINA.

Cosmotriche (?) brachycera, n. sp.

Male, 40 mm. Head, palpi, legs, thorax, and abdomen dark fuscous; thorax with a transverse darker fuscous transverse stripe, edged posteriorly with ochreous. Abdomen with ochreous whitish hairs on anterior and middle segments. Antennæ white, biciliated with tufts of pale yellow hairs; at greatest length one and a half, apex of antennæ simple. Forewings elongate triangular; costa straight, hindmargin obliquely rounded, dark fuscous, dusted throughout with whitish, so as to appear ashy-grey-whitish; two well-marked black lines from one-fourth of costa to one-fourth inner-margin, strongly curved outwards on upper half; two well-marked black lines from four-fifth of costa to just before anal angle, hardly denticulate, but with a slight projection outwards in middle and just beneath costa. A triangular semi-hyaline discal spot in middle of wing, partly edged with black; cilia whitish, chequered with black at extremities of veins. Hindwings white, hairs of inner-margin blackish, costal edge blackish; cilia white, partly chequered with black. One specimen at Broken Hill in November. Not unlike *Bombyx mioleuca*, Meyr., but the curious antennæ are quite different, besides shape of wing.

GEOMETRINA.

Hydriomenidæ.

Microdes typhopa, n. sp.

Female, 22 mm. Head, antennæ, palpi, and thorax dark fuscous. Abdomen fuscous, with blackish segmental rings. Legs fuscous, sprinkled with whitish; tibiæ and tarsi blackish, ringed with white. Forewings moderate, dilated posteriorly; costa gently arched, hindmargin somewhat bowed, oblique; smoky fuscous, becoming whitish on median band; a slightly curved moderate transverse whitish fascia near base, containing a finer line of ground colour in middle throughout; anterior margin of median band edged by a similar fascia from one-

fourth of costa to one-fourth inner-margin, edged internally by a fine line of black; posterior margin of band edged by a similar, internally black-edged fascia from beyond three-fourths of costa to just before anal angle, with sharp projection outwards beneath costa, and another less pointed in middle, the fascia edged throughout externally by a line of ochreous-brown; subterminal slenderly white, indented beneath costa; a black hindmarginal line cut by veins into spots; cilia fuscous, somewhat chequered with blackish towards base. Hindwings with hindmargin hardly waved, fuscous, lighter towards base; several darker fuscous, somewhat indistinct waved transverse lines; three below middle more pronounced; cilia greyish. Markings of hindwings reproduced more clearly beneath. One specimen; Semaphore, S. Australia, in December.

SELIDOOSEMIDÆ.

Paralœa maritima, n. sp.

Male, 33 mm. Head, palpi, and thorax dark ashy-grey fuscous. Thorax with a large, dense, bifid, posterior crest. Palpi long. Antennæ ochreous-fuscous; pectinations three to apex. Abdomen grey. Legs fuscous; posterior pair whitish. Forewings elongate-triangular; costa strongly arched at base, thence nearly straight; hindmargin hardly oblique, somewhat crenulate, slightly angulated in middle, ashy-grey-whitish, densely and finely transversely strigulated throughout with darker; a thin, obscure, cuneiform mark of pale whitish-fuscous from costa at about two-thirds, reaching half across wing; a fine, blackish, interrupted hindmarginal line; cilia ashy grey-whitish. Hindwings white, with slight projections on veins four and seven, waved on upper half, lower half nearly straight, three and four from a point, grey-whitish; a more or less suffused-fuscous hindmarginal band, becoming obsolete towards anal angle; hindmarginal line as in forewings; cilia white. Underside of hindwings silvery-white, with a large, black, apical spot. One specimen at Exeter, S. Australia, in June (at light). In Mr. Meyrick's generic description the apex of the antennæ is said to be simple; in the present species the ciliations reach the apex, although extremely short at that point.

NOCTUINA.

Noctuidæ.

Agrotis callimera, n. sp.

Male and female, 38-40 mm. Head and face pale-ochreous. Palpi ochreous; second joint thickly infuscated on sides

externally. Thorax and antennæ ferruginous-brown ; ciliations about one-half. Legs greyish ; tibiæ spinose ; tarsi fuscous, ringed with ochreous-white. Abdomen greyish-ochreous, clothed with whitish hairs on anterior segments. Forewings elongate, moderate ; costa nearly straight ; hindmargin oblique, ferruginous-brown, in some specimens becoming olive-greenish ; all veins more or less outlined with whitish ; a dull, leaden, reniform spot at end of cell, upper lobe more or less internally whitish ; a transverse row of blackish points on veins from about three-fourths of costa to three-fourths of inner margin ; a moderately broad, silvery-whitish hindmarginal band ; a hindmarginal row of black points ; cilia chestnut-brown. Hindwings and cilia pale creamy-ochreous. Five specimens at Exeter, S. Australia, in March. Although somewhat variable, it is an easily recognised species. Mr. Meyrick, to whom I submitted the species, returned it as unknown to him.

AGROTIS GYPSINA, n. sp.

Male, 34 mm. Head, thorax, palpi, abdomen, and legs white ; tibiæ spinose, fuscous, tarsi ringed with white. Antennæ fuscous, shortly ciliated, about one-half. Forewings elongate, moderate ; costa nearly straight, hindmargin oblique ; white ; three short oblique blackish dashes on costa—one near base, one at one-fourth, and one beyond middle—first one more or less continued half across wing as a zigzag line ; a transverse row of fine black points from about three-quarters of costa to three-quarters inner-margin ; a yellow reniform spot at end of cell, cut by a fine black line, and suffused beneath with fuscous ; a hindmarginal row of blackish dots. Hindwings and cilia white, a hindmarginal row of small black lunules. Two specimens taken by Mr. Harold Lower at Exeter, South Australia, in March.

HYPENIDÆ.

HYPENA MESOCHRA, n. sp.

Female, 30 mm. Head, antennæ, thorax, and palpi ochreous fuscous, slightly reddish tinged ; palpi nearly five times as long as width of eye ; grey-whitish beneath on lower half. Abdomen and legs grey, slightly ochreous tinged beneath. Forewings elongate triangular, costa slightly sinuate beneath apex, bowed outwards in middle, thence oblique ; ochreous fuscous ; a faintly indicated fuscous median band broadest on upper half, margins waved ; anterior edge from one-third costa to one-third inner-margin ; posterior edge from beyond two-thirds of costa to just beyond middle of inner-margin, faintly edged with lighter ochreous ; two fine blackish dots transversely placed at end of cell, a curved row of ill-defined fuscous dots from five-sixths costa

to just before anal angle, posteriorly edged with whitish dots; a hindmarginal row of fuscous dots between veins; cilia ochreous, slightly reddish-fuscous tinged. Hindwings with hindmargin waved; pale greyish ochreous, fuscous tinged; a denticulate fuscous line from beyond middle of costa to just beyond middle of inner-margin; a similar parallel, less distinct, yet thicker, line beyond; interspace clearer greyish ochreous; hindmarginal area suffused with ochreous fuscous; hindmarginal dots and cilia as in forewings. One specimen; Gisborne, Victoria, in January. Quite distinct from any other species of the genus that I have met with.

TINEINA.

ÆCOPHORIDÆ.

PHLŒOPOLA PYROCENTRA, n. sp.

Male, 20 mm. Head, thorax, and antennæ fuscous. Antennal ciliations one and a-half. Palpi whitish. Legs greyish, banded with fuscous; posterior pair wholly grey. Abdomen grey. Forewings moderate, elongate, costa gently arched, hindmargin obliquely rounded; dark fuscous, with a broad, fleshy-red, suffused, longitudinal streak through middle of wing, becoming blotch-like towards hindmargin; two or three very suffused blackish spots on upper edge, a short, fuscous streak at one-third from base, placed on band; cilia fuscous. Hindwings and cilia fuscous. One specimen, Broken Hill, N.S.W., in April. A curious-looking and distinct insect. The palpi are rather short for this genus.

PHILOBOTA MONADELTA, n. sp.

Female, 25 mm. Head, palpi, and thorax orange-yellow. Second joint of palpi externally fuscous on apical half. Thorax with a narrow, dark-purplish-fuscous anterior band. Antennæ fuscous. Abdomen greyish. Legs greyish; posterior pair yellowish. Forewings elongate, moderate; costa gently arched, apex round-pointed, hindmargin oblique; bright yellow; a small, irregular, dark-fuscous patch on anal angle; cilia yellow, tips fuscous-tinged, becoming fuscous on anal spot. Hindwings dark-fuscous, becoming lighter towards base, hairs at base yellow; cilia fuscous, mixed with yellow round anal angle. One specimen near Sydney in December (Coll. Lyell). Rather an abnormal-looking species, recalling a large specimen of *Microbela epicona*, Meyr.

PELTOPHORA (?) LEUCOPLACA, n. sp.

Female, 18 mm. Head and palpi snow-white, second joint of palpi infuscated externally, especially towards base. Thorax

fuscous, with a large white quadrate spot on posterior half. Antennæ and legs whitish, posterior legs ochreous. Abdomen greyish ochreous. Forewings elongate, moderate; costa gently arched, apex round pointed, hindmargin obliquely rounded, brownish ochreous; a large snow-white blotch at base, extending along inner-margin to about one-third, and only separated from costa by a line of ground colour; a suffused erect white triangular spot on inner-margin at anal angle; a similar, but more oblique, one from costa just before apex, nearly touching apex of previous spot; a small suffused, whitish spot on middle of costa; a minute fuscous dot in apical white spot; cilia ochreous-brownish, median third white. Hindwings greyish-ochreous; cilia pale-yellowish; underside of wings more yellowish tinged. In the present species, which is doubtfully referred to *Peltophora*, veins 3, 4, and 5 of forewings are closely approximated, yet separately at base—a rather unusual character in this group. The hindwings are normal. The antennal pecten is not traceable, having apparently been denuded. One specimen at Mackay, Queensland, in December.

Orophia marmorea, n. sp.

Male, 17 mm. Head, thorax, palpi, and antennæ white; antennal ciliations two, terminal joint of palpi hardly more than half of second. Abdomen greyish. Legs grey, posterior pair whitish. Forewings elongate, moderate; costa gently arched, apex hardly pointed, hindmargin oblique, white, markings ochreous brown; a narrow, somewhat indistinct costal streak, attenuated at base; a suffused indistinct line, commencing at base in middle and ending just near apex, a well-defined discal spot at one-third of this streak, a second obliquely below it; a moderately thick fascia from costa at apex to anal angle, strongly indented inwards in median portion; a row of blackish fuscous interrupted spots along hindmargin and apical fourth of costa; cilia pale yellowish. Hindwings and cilia grey, cilia yellowish tinged at base. One specimen at Mackay, Queensland, in April. This species partakes somewhat the characters of both *Saropla*, Meyr., and *Orophia*, Meyr., but seemingly distinct from either by the palpi.

Cæsyra argyraspis, n. sp.

Female, 15 mm. Head, palpi, and thorax ochreous-orange. Legs and abdomen greyish. Forewings moderate, elongate; costa hardly arched, apex somewhat pointed; hindmargin oblique, dull-ochreous-orange, with silvery-white markings; a somewhat broad costal streak from base to apex and right through cilia, attenuated towards base; three elongate, hardly connected spots in middle of wing, first narrowly elongate, attenuated at base,

second and third in a direct line with first, obcordate, apices turned towards hindmargin ; a narrow streak along inner margin, continued along hindmargin and ending immediately below apex ; cilia ochreous-fuscous, terminal-half grey whitish. Hindwings greyish-fuscous ; cilia grey, basal-half fuscous. One specimen in November at Bulimba, Queensland. Recalls typical species of *philobota* in markings.

GELECHIADÆ.

Gelechia hemichlæna, n. sp.

Female, 10 mm. Head and thorax whitish. Abdomen greyish. Palpi white, terminal joint fuscous, acute. Legs greyish. Antennæ two-thirds. Forewings narrow, apex hardly pointed, hindmargin oblique; white; markings cloudy-fuscous ; a suffused, inwardly-oblique, narrow fascia, reaching half across wing, space between this and base, suffusedly-fuscous, occupying lower half of wing, space towards hindmargin lighter fuscous ; five or six suffused costal spots on apical third of wing, separated by small spots of ground colour ; an irregular mark at apex; cilia fuscous, with a dark fuscous median line. Hindwings with termen sinuate, light-greyish-fuscous ; cilia greyish. One specimen, Broken Hill, in November.

Gelechia monoleuca, n. sp.

Female, 18 mm. Head, palpi, antennæ, and thorax black ; antennæ somewhat serrate. Abdomen grey, posterior half black, anal tuft whitish. Legs blackish, middle tibiæ ringed with whitish, posterior legs with tufts of white hairs at base of joints, tibiæ wholly whitish. Forewings elongate, moderate, costa gently arched, apex rounded, hindmargin obliquely rounded ; black, somewhat shining ; a moderate well defined snow-white spot in middle of wing at two-thirds from base ; various minute whitish spots along veins, scarcely perceptible ; a hindmarginal row of minute whitish dots ; cilia black. Hindwings with termen not sinuate, six and seven stalked, greyish, blackish tinged, except at base ; cilia fuscous. One specimen taken at Gosford, N.S.W. (Coll. G. Lyell, jun.)

Gelechia (?) micromela, n. sp.

Female, 10 mm. Head, thorax, abdomen, and legs black ; palpi yellowish, second joint fuscous externally on basal half. Antennæ thickened, ochreous, somewhat infuscated. Forewings moderate, rather short, costa gently arched ; shining deep purple blackish, without markings, seven to apex ; cilia blackish. Hindwings blackish, thinly scaled ; three and four long stalked, six and seven stalked ; cilia as in forewings. Doubtfully referable

to *Gelechia*. Vein 7 can hardly be said to terminate on costa, more correctly the apex. The stalking of veins 3 and 4 of the hindwings would remove it from the *Gelechiadæ* altogether, but as the species partakes very much of the facies of a *Gelechia*, I place it here until I obtain more material. Superficially it reminds one of the genus *Petalanthes*, one of the *Œcophoridæ*. One specimen; Gisborne, Victoria.

GELECHIA DESMATRA, n. sp.

Male, 9 mm. Head, palpi, antennæ, and thorax ochreous-whitish. Abdomen and legs fuscous. Forewings moderate; costa hardly arched, apex rounded, whitish; a broad, thick, fuscous, transverse fascia from middle of costa to middle of inner margin, dilated on costa; two fuscous, more or less elongate, marks on costa beyond this; apical fourth of wing tinged with fuscous, and becoming darker on hindmargin, and containing a row of small fuscous dots around apex and hindmargin; cilia ochreous. Hindwings and cilia fuscous. One specimen, Broken Hill, in November.

GELECHIA OMBRODES, n. sp.

Male and female, 10 mm. Head snow-white, palpi white, second joint externally golden ochreous, except apex. Antennæ fuscous, with small fine pecten. Ciliations one. Thorax golden ochreous. Abdomen greyish. Legs ochreous brown. Forewings snow-white; a narrow ochreous brown fascia at base; a broad ochreous brown transverse fascia from three-quarters of costa to anal angle, slightly dilated on costa and inner-margin, a light ochreous-brown suffusion on apical portion of hindmargin, continued as a fine line along hindmargin to anal angle; cilia greyish ochreous, becoming darker round anal angle. Hindwings and cilia grey. Two specimens taken at Rockhampton in middle of November. This species will require a new genus. I have not yet sufficient material for dissection, but the neuration of the forewings, so far as can be made out, is as follows:—Vein one is extremely long furcate, in fact the fork reaches half the length of the cell; veins two and three are stalked, seven and eight are stalked, seven terminating on costa. The hindwings are normal, excepting that six and seven are extremely short stalked.

GELECHIA MICRADELPHA, n. sp.

Female, 10 mm. Head, palpi, antennæ, legs, and thorax yellow. Posterior legs with a black band on tibiæ (abdomen broken). Forewings elongate, moderate, narrow; costa nearly straight, hindmargin oblique, hardly sinuate beneath apex, orange-yellow; a small blackish spot on costa at one third from

base; a broad, purplish-fuscous, hindmarginal band, occupying one-third of wing, anterior edge darker, and slightly curved outwards; a yellowish, elongate spot on costal portion of band; cilia fuscous, at base becoming yellowish. Hindwings with termen sinuate, dark-fuscous; cilia nearly one-half, fuscous. One specimen, taken at Broken Hill, N.S.W., in November. Nearest *porphyrloma*, Lower, but differs by the smaller size, different shaped hindmarginal band, and costal spot.

ANARSIA DRYINOPA, n. sp.

Female, 12 mm. Head, palpi, antennæ, thorax, and legs ashy-grey-whitish. Terminal joint of palpi whitish, with blackish ante-apical band. Antennæ annulated with white. Thorax more whitish, with an apparent fuscous, median stripe. Abdomen greyish. Forewings elongate, rather narrow; costa gently arched, apex pointed, hindmargin oblique; ashy-grey-whitish, mixed with fuscous and dark fuscous; markings very obscure; three short, blackish, outwardly oblique, costal spots between base and middle; various black and whitish short dashes towards hindmargin; a blackish, crescentic mark from inner margin at one-fourth, curved round to base beneath costa; cilia fuscous. Hindwings somewhat broader than forewings, termen slightly sinuate, grey; cilia greyish. One specimen from Broken Hill, N.S.W., in October. Nearest *inodes*, Meyr., but smaller, and differently marked; it is not unlike *Gelechia aversella*, Walk.

ANARSIA (?) HOLOMELA, n. sp.

Female, 10 mm. Head, thorax, abdomen, antennæ, palpi, and legs blackish. Antennæ two-thirds, second joint of palpi with a dense loose triangular tuft of hairs; terminal joint as long as second, strongly recurved. Forewings elongate, moderate, costa gently arched, apex rounded, hindmargin obliquely rounded, seven and eight stalked, seven to costa, three and four stalked; black, with hardly perceptible scattered minute blackish spots; an irregular blackish hindmarginal line; cilia light fuscous. Hindwings fuscous, termen slightly sinuate, six and seven stalked; cilia about one-third, fuscous. One specimen; Broken Hill, in June.

ARISTOTELIA (?) MONOSTROPHA, n. sp.

Female, 13 mm. Head, palpi, thorax, and legs greyish; face whitish. Antennæ whitish; ciliations one, with pecten. Second joint of palpi not tufted. Forewings lanceolate, moderately broad; ochreous-brown; a broad, somewhat suffused-white streak from base to apex, broadest in middle, extremities attenuated; a dark-fuscous dot in middle, resting on lower portion of streak; cilia greyish. Hindwings greyish; cilia ochreous-grey. One

specimen in March, Broken Hill, N.S.W. Similar in appearance to *epispila*.

ARISTOTELIA (?) EPISPILA, n. sp.

Female, 12 mm. Head, palpi, antennæ, and legs greyish-fuscous. Apex of second joint of palpi whitish. Posterior legs grey; abdomen broken. Forewings linear, apex pointed; pale-brownish; a broad, whitish, longitudinal streak from base to apex, occupying upper half of wing throughout; two dark fuscous dots, one before and one beyond middle of disc, placed on upper edge of ground colour; some suffused fuscous spots towards hindmargin; cilia grey. Hindwings linear, termen sinuate, whitish; cilia nearly two, colour as in forewings. One specimen, Parkside, S. Australia, in March. I am not quite certain as to the correct location of this species; for instance, veins seven and eight of forewings appear to run out of six, which is unusual in this genus.

YPSOLOPHUS DRYINODES, n. sp.

Female, 25 mm. Head, palpi, thorax, legs, and antennæ fuscous; palpi darker-fuscous on sides; second joint grey-whitish above. Abdomen greyish. Forewings moderate; costa gently arched, hindmargin oblique; fuscous, with innumerable, darker-fuscous, minute dots, more pronounced along costa and veins towards hindmargin, where they appear in longitudinal rows; there also appears to be three oblique, transverse rows of similar spots from one-fourth of costa to about one-fourth inner margin; one from middle of costa to before middle of inner margin; another from near three-fourths of costa to beyond middle of inner-margin; veins two and three stalked; cilia reddish-fuscous. Hindwings and cilia fuscous. Three specimens at Brisbane in December.

EUTORNA (?) NIPHODES, n. sp.

Female, 10 mm. Head, antennæ, palpi, and thorax white; second joint of palpi infuscated beneath. Abdomen grey-whitish. Forewings linear, apex pointed; white, tinged with ochreous towards apical third; a black dot in disc at one-third, another obliquely beyond and below; a third, larger, in middle of disc at two-thirds; a row of three or four black dots along apical fourth of costa; an obscure blackish dot at anal angle. Hindwings grey; cilia three, whitish. One specimen, Gisborne (?), Victoria, in March.

EUTORNA STRATIMERA, n. sp.

Male, 12 mm. Head, antennæ, palpi, thorax, abdomen, and legs dark fuscous; antennæ biserrate, very shortly ciliated; hairs

of upper portion of second joint of palpi white. Forewings linear, apex pointed; dark ashy-grey-whitish; a narrow whitish line along costa from base to apex, finely attenuated along apical three-fifths: extreme edge of costa black at base; cilia fuscous. Hindwings fuscous; cilia one and a half; greyish-fuscous. One specimen, Belair, S. Australia, in November.

Cleodora eumela, n. sp.

Female, 12 mm. Head, palpi, thorax, abdomen, antennæ, and legs black; second joint of palpi with a dense projecting tuft, terminal as long as second, recurved. Forewings moderate, elongate; costa gently arched, apex hardly pointed; hindmargin oblique, seven and eight to costa; black, with faint indications of a few blackish scattered dots in disc and along hindmargin; cilia fuscous-grey. Hindwings slightly sinuate beneath apex; blackish, becoming lighter towards base; cilia as in forewings. One specimen from Stawell, Victoria, in December.

Pogonias (?) leucoma, n. sp.

10 mm. Head, palpi, and thorax snow-white. Antennæ fuscous, white at base. Abdomen and legs greyish. Forewings narrow; costa nearly straight, apex hardly pointed, fuscous; a broad, suffused-white, longitudinal streak from base to middle, thence curved up to costa near apex, sharply defined on basal half, somewhat suffused beyond: a small, elongate, blackish mark in sinuation of white streak; cilia greyish-fuscous. Hindwings narrow, fuscous; cilia three, greyish-fuscous. One specimen at light, Mackay, Queensland, in August.

Pogonias capnopa, Lower.

In my original description, the abdomen of this species was not described. Having obtained an additional specimen, I am enabled to complete the same. The description should read:—"Abdomen fuscous, ochreous in middle." The cilia of the hindwings have an ochreous tinge in the specimen before me, which I captured at Broken Hill, N.S.W., in April.

PLUTELLIDÆ.

Plutella ochroneura, n. sp.

Female, 16 mm. Head, thorax, antennæ, palpi, and legs ochreous-white. Abdomen greyish. Forewings rather narrow; costa gently arched, apex pointed, whitish; all veins outlined with pale-ochreous-yellow, giving the appearance of being ochreous-white; cilia ochreous, at apex becoming ochreous-white. Hindwings lanceolate-linear, whitish; cilia two and a-half, whitish. One specimen, Semaphore, S.A., in November.

TINEIDÆ.

Erechthias polyspila, n. sp.

Male, 8–10 mm. Head black, face and crown white; palpi, thorax, and antennæ blackish; second joint of palpi whitish above. Legs fuscous, posterior pair greyish. Forewings linear, apex pointed, dark fuscous, with whitish markings; a short straight, fine streak from base in middle to one-sixth; a similar shorter, but somewhat thicker one, immediately following, but slightly above; a fine streak along inner-margin from base to anal angle, finely attenuated on posterior third; a fine irregular oblique fascia from just before three-fourths of costa to anal angle, touching end of preceding streak; a rather thick short fascia from costa just before apex, reaching about half across wing; a round black spot at apex, encircled by dull whitish; cilia fuscous, whitish at base, and with a blackish median line. Hindwings and cilia fuscous. One specimen, Parkside, S. Australia, in October.

Notes on the Glacial Features of the Inman Valley, Yankalilla, and Cape Jervis District.

By Prof. T. E. W. David, B.A., F.G.S., and W. Howchin, F.G.S.

[Read June 1, 1897].

In 1859 Mr. Alfred R. C. Selwyn, Government Geologist of Victoria, made a hurried, but extensive geological tour in this colony by request of the South Australian Government. In his official report he says :—"At one point, in the bed of the Inman, I observed a smooth, striated, and grooved rock surface, presenting every indication of glacial action. . . . This is the first and only instance of the kind I have met with in Australia, and it at once attracted my attention." This glacial pavement was not subsequently observed till rediscovered by the authors of this paper and Mr. C. C. Brittlebank in March last. The journey was undertaken with the express object of investigating the glacial features of the neighborhood, with the result that the investigators are much impressed with the clearness of the glacial evidences, as well as their magnitude. It is not intended in the present paper to give a detailed description of the observations made (that will take the form of a Report from the Glacial Committee to the Australian Association for the Advancement of Science), but it was thought desirable to give an early and local statement of some of the leading facts which have been obtained on this subject.

On leaving Port Victor by the Inman Valley road, about one and a-half miles from the township, numerous large blocks of granite are seen in the paddocks on the left hand side of the road. Similar erratics can be noted on the hillsides bordering the road almost the entire length of the valley to Normanville.

In the bed of the Inman, a little west of the seventh milepost from Port Victor, a very fine exposure of a polished ice-pavement occurs. It is situated on the North side of the stream, within the limits of the flood-waters, and passes under a bank of recent river silt. There is a continuous, highly-polished floor, measuring 20 ft. by 6 ft., with a surface slightly sloping towards the stream. It is deeply grooved and striated, the striæ having a direction of W. $9\frac{1}{2}^{\circ}$ N., conforming to the general trend of the valley. The stone which has taken the polish is a hard, dark-

colored quartzite, very favorable for recording the effects of ice-action. This exposure must take rank as the finest example of a glacially-polished rock known within the limits of Australia. Most likely it is the identical example discovered by Selwyn 38 years ago, and may appropriately be called "Selwyn's Rock." A few yards higher up the stream, in a wash-away on its Southern bank, another polished surface of smaller extent is seen. The striæ are in the same direction as on the larger face, and cross the bed of the stream diagonally. The only other places where striated rock was noticed was in a tributary of the Bungala River, near its source on the Western side of the Bald Hills, about four miles from Yankalilla, where two small patches, a foot or two square, with overlying drift, were seen. Here also the glaciated rock is a highly siliceous quartzite, similar to the large polished surface in the Inman, and the striæ show the same general direction.

On the rising ground above the glaciated floor (already described), near the seventh mile-stone, there are immense blocks and groupings of granite boulders scattered over the sides of the hill. Some of these are so massive that at first sight they look like rocks in situ. Close by, a mountain torrent has cut its way through a bed of drift, studded with glaciated stones at an altitude of about 100 ft. above the glacial floor in the bed of the river.

From this point, for several miles up stream, the glacial drift is seen at intervals in the banks of the river. Its general feature is a soft sand rock carrying glaciated stones, and in places is seen to rest on a dark-colored arenaceous clay with few stones. In some instances the sand rock is considerably indurated and carries beds of conglomerate irregularly distributed. Several readings of these drift beds gave a dip of about 7° to E.S.E.

Between the ninth and tenth mileposts large granite boulders are extremely common in the Inman, in some places almost choking the bed of the river. One hundred large examples were counted in the distance of a hundred yards. Blocks of granite were measured equalling ten, eleven, and twelve feet in their longer diameters.

In the upper reaches of the Inman the erratics are fewer in number, and the glacial drift occurs as a soft, bluish-black clay, which is more or less sandy in composition.

About 15 miles from Port Victor the Bald Hills watershed crosses the valley transversely, cutting off the eastern (*i.e.*, the Inman and Back Valley) drainage, which finds its outlet at Port Victor; from the western (*i.e.*, the Bungala and Yankalilla River systems), which flow into Gulf St. Vincent. The road crosses the watershed at a height of 640 ft. above sea level. The ice has

crossed this barrier in its passage westward, leaving abundant evidences of its former existence by thick deposits of drift and glaciated stones on the summit of the range, with drift beds, numerous erratics, and the polished rock surfaces already referred to on the western or further flanks of the watershed. At the summit of the Bald Hills the soil is deep and remarkably dark in colour, more like a marsh soil than what usually occurs on the crest of a hill. This "rich black soil of the Bald Hills" attracted Selwyn's attention, but he was unable to account for it. It is not unlikely to have been derived from a similar deposit as the bluish-black glacial drift, which has a considerable development in the Inman Valley.

Time prevented a close examination of the lower levels of the Bungala Valley, which near Yankalilla are largely obscured by recent river wash, but glaciated erratics were observed on the hills two miles north of Normanville at a height of about 200 ft. above sea level.

Taking advantage of the Easter holidays, one of us returned to the district for further investigations. The Bald Hills watershed was explored to the northward of the main road, when granitic and other erratics were found scattered over Mr. J. R. Kelly's fields near the crest of the hills, some of them being facetted and scratched.

A high ridge runs up the centre of the main east and west valley between Port Victor and Normanville, separating the Inman Valley from the Back Valley. At a point about seven and a half miles from Yankalilla a district road was followed, which passes over this central ridge. Erratics were seen at intervals on the rise, some of considerable size; and a granite boulder three feet in diameter was noted close to the road near the crest of the hill. As near as could be judged, in the absence of an aneroid, this ridge is about 500 ft. above the bed of the Inman, and about 100 ft. above the greatest height of road that passes over the Bald Hills. After passing the crest of the hill, the ground drops about 100 ft., and the road continues along the crest of a lower range, which has a trend of S.S.E. and N.N.W. On this range there are two road cuttings, each about 100 yards in extent, showing soft yellow sandstones, unstratified, but contorted. Dark-coloured argillaceous bands run most irregularly through the stone, sometimes forming loops. No stones were seen in the sandstone itself, but several striated stones were picked up loose in the cutting. About a quarter of a mile beyond the second cutting a stony patch is exposed on the northern side of the road on the slope of the hill, many of the stones showing glacial features. The bed of the Back Valley Creek is much silted, and only two small patches of the yellow sandstone similar to the

sandy glacial drift of the Inman were noticed in the bed of the stream. It was in this valley that the three bores of the Victor Harbour Coal Company were put down, passing through sandstones, shales, and boulder beds to a depth of 964 feet before the old rocks were touched.

The most remarkable section of glacial drift discovered in the district was in the Government Quarry in Woods Creek, a tributary of the Bungala, and situated about a mile from the centre of the township of Yankalilla. It is a white, yellow, and grey sandstone, soft near the surface, but passing down to very strong posts in the bottom of the quarry, which can only be won by blasting. The stone is much jointed and appears to dip at 20° to N.N.W. There is a vertical exposure of about 50 feet, and the quarry has been opened for a distance of about 150 yards. The appearance of the face is very remarkable. Large and small erratics are plentifully distributed throughout its entire thickness, granite being very conspicuous, but mostly rotten. One of the latter fragments was noticed that measured 18 in. by 10 in. The included stones, where not decomposed, are for the most part glacially smoothed or striated. The quarry has been used for years as a supply for road metal, and has made Yankalilla and neighbourhood famous for its good roads. In the creek, close by, the drift is seen to rest unconformably on quartzite thickly penetrated with a network of syenitic and other igneous veins. No polished pavement at the line of junction was visible.

On the road between Yankalilla and Cape Jervis proofs of glacial action were seen in two places. About nine miles from Yankalilla, in a cutting of the road on the eastern side, a subangular erratic of red quartzite measuring 18 in. by 11 in. lies near the top of the bank. The stone is very highly polished and striated, and close to it is a sharply angular grey quartzite of larger size, but not showing glaciation on the faces exposed. Estimated height above the sea, 300 feet.

On the south side of Fowler's Hill, just past the 59th milepost from Adelaide (13 miles from Yankalilla), a section of glacial drift with striated pebbles is exposed in a road cutting. The drift occurs on the eastern side as a pocket 33 yards long and 12 feet high, enclosed within calcareous shale. Erratics are numerous, the largest observed being a greenish quartzite 12 in. by 6 in., exhibiting striæ. Estimated height above level of sea, 500 feet.

At Cape Jervis there is the most extensive development of glacial Till that has been up to the present observed in South Australia. The morainic material occupies the background to the lighthouse in crescent-shaped hills more than a hundred feet

high. Large single erratics, as well as groups up to 30 in number, can be seen on the hillsides, and where a wash has occurred the glaciated stones can be picked up in great numbers. Amongst these, rounded quartz pebbles are conspicuous and in nearly every case show polished faces. Amongst the larger erratics granite boulders are the most common, and are associated with a few quartzites, one of which measured 7 ft. 6 in. by 3 ft. 9 in., exposed above the Till, in which it is partially buried. On the hillsides above the lighthouse (where these large boulders have been weathered out) the sloping ground is well grassed, which obscures much of the glacial features; but the Till bed follows the northern trend of the coast line, exhibiting a steep and bare cliff face of the most instructive character. It is here seen that the bed is a true unstratified Till crowded with travelled stones, mostly ice-marked. A complete section is visible of a great Till bed of over 100 feet in thickness, resting unconformably on a floor of palæozoic rocks, and capped by variegated (? Miocene) clays and a superficial travertine crust. The bed-rock is soft and much decomposed, and therefore unsuitable for receiving or retaining a glacial face. The glacial outcrop was traced along the line of cliffs for about three-quarters of a mile without reaching its termination.

Observations made from the top of the coach, on the return journey from Yankalilla to Adelaide, it seems highly probable that the glacial sandstone extends for about ten miles from Yankalilla in that direction, as evidenced by (*a*) the road metal; (*b*) on top of hill above Wattle Flat (44 miles from Adelaide) the yellow sandstone characteristic of the glacial beds of the locality outcrops by the roadside; (*c*) on hill north side of Wattle Flat Post Office what appears to be a Till with stones is exposed in road-cutting; (*d*) and at 41½ miles from Adelaide this (?) glacial sandstone is once more seen in outcrop by the roadside.

These observations require to be confirmed by a closer examination of the country, but it seems probable that the glaciation had its Northern limits determined by the lofty Sellick's Hill Range.

General Deductions.

1. The stratigraphical features of the glacial beds of the district have been but imperfectly traced, but they appear to be devisable into two well-marked lithological types—

(a) An unstratified Till, of a dark color, more or less arenaceous, either with or without glaciated stones.

(b) Yellow and grey sandstones and conglomerates varying from a soft, friable sand-rock to a hard, siliceous sandstone, which, in the latter case, is extensively jointed. These sandstones are

mostly destitute of stratification, and generally contain erratics. Even where no stones can be seen in the face, striated stones are almost invariably found on the surface of outcrop as though weathered out from the bed.

The borings put down by the Port Victor Coal Prospecting Company in the Back Valley show throughout their entire depth alternating dark arenaceous mudstones with sandstones and boulder beds similar to those observed at the surface. The continuity of the glacial beds to the 960 ft. depth, as proved by bores, seems beyond doubt. This gives a thickness approximately of 1,500 ft. of glacial deposits in the Back Valley.

[The association of Till beds intercalated with yellow sandstones, as described above, offers a close analogy with the Bacchus Marsh series of Victoria.]

2. The very wide area over which glacial features have now been proved to exist leads to the conclusion that the greater part of the Cape Jervis Peninsula, with Port Victor and Normanville (or even Myponga) as the base of the triangle, has been visited by ice, an area of more than 300 square miles.

3. The direction of the striæ, as well as the distribution of the transported material, point to the region of the Southern coast, from Port Elliot to Kangaroo Island, or even much further into the Southern Ocean, as the probable centre of dispersion. Blocks of Port Victor granite can be traced as far North as Hallett's Cove. The direction in which the ice travelled was therefore in opposition to the present drainage of the land, which is, generally speaking, from North to South.

4. In the present stage of our observations it is a little difficult to say definitely what form the ice took in this extensive glaciation. Was it in the form of glaciers, icebergs, or coast ice? Many of the phenomena seem best explained by the supposition of land ice as the agent—such as the great extent of polished rock surfaces [as at Hallett's Cove], the depth and uniform direction of the striæ, and the great number of scratched and facetted stones contained in the drift. If the ice was in the form of glaciers, it would require a great extent of highlands to the South, sufficient to form vast snowfields, from which tongues of ice radiated. The transported material being essentially local in its origin, is not likely to have been carried by icebergs, so that the only alternative is that of ice-floes or coast-ice being the transporting agent. On this theory the Bald Hills, which are now 600 or 700 feet above sea level, and are capped with glacial drift, must at the time of glaciation have been at or below sea level. When the locality has been more thoroughly examined, it is not unlikely that evidences will be found that will set this question at rest.

5. The presence of variegated (? Miocene) clays and travertine as a capping to the Till at Cape Jervis, although in the absence of fossils cannot be taken as conclusive, seems to point, like the Hallett's Cove section, to a Pre-Miocene age of the glaciation.

6. The additions to our knowledge of this important period of glaciation in Southern Australia tend to confirm the opinion already expressed by us elsewhere,* that the South Australian glaciation was synchronous with the great Victorian glaciation of Permo-Carboniferous age. No palæontological proofs of this have been obtained in the drift beds of this colony, but the lithological characteristics of the South Australian drift agree very closely with the Victorian beds; whilst the great changes that have taken place in the physical features of the country since the ice age, may well draw upon a period of time for their accomplishment equal to that which separates the Permo-Carboniferous age from the present.

Thanks are due to Mr. F. G. Raymond, of Yankalilla, by whose valuable assistance our work was greatly facilitated in examining the Yankalilla and Cape Jervis Districts.

* Aus. Asso. Adv. Science, vol. VI., p. 318.

On Evidences of Glaciation in Central Australia.

By Professor Ralph Tate.

[Read June 1, 1897.]

In the "Geology of the Horn Expedition," vol. II., p. 72, there is described a section of Yellow Cliff, at the south-east bend of the River Finke, near Crown Point Head Station. The chief feature presented by that section is the tumultuously-bedded material, many of the included pebbles, which range up to two feet cube, are standing on end, some of the pebbles are, moreover, sub-angular, smooth, and striated. When on the outward journey, this section was closely studied, and partly in the company of Professor Spencer,* to whom I announced my opinion that some of the pebbles evidenced glaciation. However, as I failed to recognise any similar signs of glaciation or co-ordinate phenomenon during the rest of our exploration, I, on my return to Yellow Cliff, and after a brief re-examination of the pebbles, attributed the striation of the pebbles to bedding-lines.

Professor Spencer, during the early part of this year, collected pebbles from this section, which Professor David informs me are undoubtedly glaciated, and thus confirms my first impression as to the nature of their surface-sculpture.

The occurrence of large boulders on the north side of Cunningham Gap, described by East (Trans. Roy. Soc., vol. XII., p. 44), may therefore be explained as ice-borne.

Date of Glaciation.—Cunningham Gap is a short north and south transverse gorge in a mural line of cliff, which is constituted of the following strata, as determined by me in the tabular mass of it known as Crown Point:—"Desert Sandstone" in three horizontal bands, about 50 feet, resting on false-bedded friable felspathic sandstone and purple hard sandy clays dipping south at about 50°. These latter are probably decomposed Archæan-rocks, such as those described by East (op. cit., p. 45) at Polly Springs, about 20 miles to the north.

The formation of Cunningham Gap is of course posterior to the deposition of the Desert Sandstone and its subsequent structural alteration, and thus inferentially is that of the accumulation of the glacial-debris at Yellow Cliff. Moreover, pebbles of Desert Sandstone occur in large proportion in the debris, and these are readily distinguishable from the Ordovician quartzites or the Archæan glassy quartzites which occur in the Macdonnell Ranges.

* My coadjutor, Mr. A. Watt, in the Department of Geology, had not the opportunity of studying this section.

A List of Plants Collected by the Calvert Expedition.

By Professor Ralph Tate.

[Read July 6, 1897.]

The collection of plants under review is supplemental to the main gathering made by the naturalist to the Expedition (Mr. Keartland) which was abandoned at Joanna Springs. It was made between December 22, 1896, and March 17, 1897; firstly whilst stationed at the junction of the Fitzroy River and Margaret Creek, about 150 miles from Derby; and secondly, whilst on the search for his missing colleagues, embracing 100 miles down the Fitzroy, thence south to near Joanna Springs, and thence to Derby.

The collection comprises about 100 species, but about a moiety of them is represented by foliage, though of the latter a few admit of assignment to specific denomination.

The facies is that of the Eremian botanical province, largely comprised of Indo-Australian species, such as prevails over the table-land skirting the littoral tracts of North-Western Australia.

The region botanically explored by Mr. Keartland has been somewhat extensively reported upon by the late Baron Mueller through the collections made by himself, Mr. F. Gregory, Sir John Forrest, and lately by Mr. Tepper ("Plants of Roebuck Bay") in Trans. Roy. Soc., S. Aust., 1892.

Rare or previously unrecorded species are the following:—*Capparis umbonata*, *Hibiscus panduriformis*, *Polycarpæa violacea*, *Trichinium arthrolasium*, *Gomphrena affinis*, *G. Brownii*, *Cassia concinna*, *Indigofera viscosa*, *Neptunia gracilis*, *Acacia suberosa*, *A. dineura*, *Melaleuca lasiandra*, *Gardenia Keartlandi*, n.sp., *Tragus racemosus*, *Perotis rara*, and *Andropogon gryllus*.

Of the various collections made from this region it is noteworthy how few are the species in common, and though the greatest number enumerated in any one collection does not exceed 250, yet in the aggregate the flora numbers over 600.

Capparideæ.—Cleome viscosa. Capparis umbonata.

Violaceæ.—Hybanthus suffruticosum.

Zygophylleæ.—Tribulus terrestris, T. Solandri.

Malvaceæ.—Abutilon otocarpum. Hibiscus microchlænus, H.

panduriformis. Gossypium australe. Adansonia Gregorii; fruit five inches long and four inches diameter.

Sterculiaceæ.—Brachychiton Gregorii. Seringea integrifolia.

Tiliaceæ.—Corchorus vermicularis, C. sidoides. Triumfetta chætocarpa.

Euphorbiaceæ. — Euphorbia Drummondii, E. alsinæflora. Petalostigma quadriloculare.

Sapindaceæ.—Atalaya hemiglauca.

Caryophylleæ.—Polycarpæa violacea; a stouter plant than usual, and densely fasiciled at the nodes.

Amarantaceæ.—Gomphrena flaccida, G. affinis, G. Brownii. Ptilotus arthrolasius; this species was collected by Sir John Forrest, but as yet unrecorded, so I am informed by the Curator of the National Herbarium, Melbourne.

Salsolaceæ.—Enchylæna tomentosa.

Ficoideæ.—Trianthema pilosa.

Phytolacceæ.—Codonocarpus cotonifolius.

Nyctagineæ.—Boerhaavia diffusa.

Leguminosæ.—Crotolaria Cunninghami. Indigofera viscosa. Tephrosia purpurea. Abrus precatorius. Cassia concinna. Bauhinia Leichhardtii. Neptunia gracilis. Acacia dineura, A. tumida, A. stipuligera, A suberosa.

Combretaceæ.—Gyrocarpus Americanus.

Myrtaceæ.—Melaleuca leucodendron, M. lasiandra. Eucalyptus terminalis. Barringtonia acutangula.

Santalaceæ.—Santalum lanceolatum.

Proteaceæ.—Grevillea refracta. Hakea macrocarpa.

Cucurbitaceæ.—Cucumis trigonus. Mukia scabrella.

Rubiaceæ.—Gardenia Keartlandi, *Tate.*

Shrubby, branchlets thick, the young shoots resinous (the resin collecting as small drops of a clear amber color). Leaves shortly petiolate, oval-oblong, obtuse at both ends, coriaceous, penninerved and reticulate, not exceeding one and a-half inches long, glabrous. Flowers white, terminal, solitary, shortly pedicellate, sweet-smelling. Calyx-limb shortly tubular-campanulate, with six, linear-obtuse lobes (two a little longer and wider than the others); calyx-tube about as long as the lobes (about 4 mm.), not ribbed. Corolla-tube nearly one inch long (23 mm.), slightly dilated upwards; lobes six, oblong, about half-length of tube. Fruit globulose to ovoid-globular, about one inch diameter (25 mm.), crowned by the base of the calyx-tube; endocarp dense, hard, cartilaginous, 2 mm. thick; the rind dry and thin, at least in the dried specimens; placentas three.

One flower only (which has not been dissected), six ripe fruits. Fitzroy River, Calvert Exploring Expedition.

This new species differs from its Australian congeners with

similar calyces in the young shoots being resinous, not pubescent; and from those with resinous shoots by its deeply toothed calyx. It would appear from description that it approximates in general characters to *G. pyriformis* on the one hand and to *G. resinosa* on the other.

Convolvulaceæ.—Ipomœa heterophylla.

Solanaceæ.—Solanum echinatum.

Bignoniaceæ.—Dolichandrone heterophylla; leaves pinnate of three pairs, leaflets oblong-oval up to one and a-half inches long.

Scrophularineæ.—Herpestis floribundus.

Asperifoliæ.—Halgania solanacea.

Commelineæ.—Commelina ensifolia.

Gramineæ.—Panicum decompositum, P. pauciflorum. Perotis rara. Tragus racemosus. Andropogon gryllus. Aristida arenaria. Eriachne obtusa. Cynodon tenellus. Sporobolus virginicus, var. pallidus. Eragrostis tenella; E. chætophylla.

Anthropological Notes relating to the Aborigines of the Lower North of South Australia.

By J. Harris Browne.

[Read August 3, 1897.]

Method of Cooking Cress (Lepidium ruderale) and of Steaming Rushes (Juncus sp.) for Fibre.

A circular hole was dug in the ground, two feet deep by three feet diameter, and into the bottom of the hole large pebbles were placed; a fire was kindled and kept burning until the stones were red hot. The embers were then taken out and sticks laid across the hole; on these a layer of reeds or damp grass was placed, and on them the cress in concentric layers, the root-ends to the outside; over the cress another layer of grass was laid and more grass round the outside of the heap. A "yam stick" was then thrust through the heap from the top, and when withdrawn water was poured down the hole thus made; this reaching the hot stones, came up in steam that permeated the whole heap, more water being added from time to time when necessary. In about an hour the cress was well cooked, and the oven ready for another fire as before.

Rushes were steamed in the same manner. They were kept warm in the heap, and taken two at a time by the women and chewed from end to end to break up the pith; they were then allowed to dry, when the pith was separated from the fibre by combing it with the fingers. The fibre was then rolled up into twine, by the men, by twirling it with the hand on the naked thigh. The twine thus made was used for making nets for fishing and for catching emu and kangaroo; for the latter the twine was about the thickness of "sash cord."

The chewing process was a very severe task for the women, and while still young their splendid teeth were worn down to the gums.

On a Method of Obtaining Game.

The grassy substance, the leaves and stems of *Xerotes effusa*, was used by the natives of the plains of the lower north for the purpose of suffocating kangaroo rats (bokra) in their burrows. The bokra afforded their chief supply of animal food at all times, but more especially during the summer months; and their skins, made into rugs, formed the only clothing they possessed. The

bokras lived in families, as many as 20 individuals in one burrow. Each burrow had several inlets, all of them converging to a central chamber, and from that chamber tunnels ran off in all directions, each one being the private residence of a family.

A burrow having being found that showed by the tracks of the animals that it was well inhabited, the native proceeded to stop up all the holes, except one on the windward side. Into the outlet opposite to and farthest from this he puts, before filling it up, a yam stick or tuft of grass. Into the open hole he then placed lengthwise a handful of the stems and leaves of this plant, set fire to it, and sat down to fan the smoke into the burrow, the fan being either an owl's wing or a bokra's skin sewn on to a forked stick.

The smoking process took from 15 to 20 minutes. When the native thought there was smoke enough in the burrow, he went to the opposite hole into which he had inserted the yam stick or tufts of grass, and if, on removing it, smoke came out freely, he knew there was enough. He then stopped up the fire hole, and, crouching down on the top of the burrow, he listened intently for the movements, coughing or sneezing, of the bokras, making marks on the ground where the sounds indicated the situation of the animals in their last dying struggle. This was often near the outlets of the burrow. When all was quiet, the native opened the outlets at the marked spots and took out all the animals within his reach. If there were not as many as he wanted, he sunk a hole down into the centre of the burrow to get at those that had died in the central chamber.

The hole sunk was about two feet in diameter, quite circular, and often four or five feet deep. Its object was to reach the point to where the different openings and tunnels converged. The tools used were a yam stick and a wooden tray or shovel eight or nine inches long by six or seven inches wide. When the hole was about 15 inches deep, the native got into it, loosening the earth between his legs with the yam stick, and threw it out over his shoulders with the shovel. It required about an hour to sink a hole four feet deep. I once saw eleven bokra taken out of one burrow, six from the outlet holes and five from the bottom of the shaft. A full-grown bokra weighs as much as an average-sized rabbit.

On the Occurrence of Lower Cambrian Fossils in the Mount Lofty Ranges.

By Walter Howchin, F.G.S.

[Read August 3, 1897.]

For the past fifty years the stratigraphical position of the Mount Lofty Ranges has been one of the most difficult, yet interesting, problems in South Australian geology. A great rampart of rock, nearly 500 miles in its longer axis, its western members composed of thick argillites, quartzites, siliceous limestones and marbles; and its easterly flanks passing into crystalline schists and great igneous intrusions, presents a bold physiographical, as well as geological, contrast to the horizontal beds which have gathered around its base. These serried heights form the most conspicuous and extensive feature in our local geology, and yet they have persistently held the secret of their age. With two doubtful exceptions (quoted by the late Tenison Woods) the most diligent search had failed to secure the faintest palæontological remains; they were consequently regarded as azoic and early observers classified them variously as older Palæozoic, or otherwise, Pre-Cambrian or Archæan.

The discovery in 1879 of a sub-crystalline limestone containing fossils of Lower Cambrian age, resting unconformably on a Pre-Cambrian series on Yorke's Peninsula, was regarded as important analogical evidence that the Mount Lofty formations were of Pre-Cambrian age, and from the date of the discovery mentioned the Mount Lofty Ranges have been generally classified as Archæan. Discoveries have been recently made, however, in these so-called Archæan rocks which have an important bearing on this subject, and on the most convincing evidence determines the basal beds of the Mount Lofty Ranges to be in part, if not wholly, of Lower Cambrian age. The locality where the Cambrian fossils were first observed was

Normanville.

It is to Professor T. W. Edgeworth David, of Sydney, that the credit of a quickened interest in these old rocks is due. During the past nine months he has sectioned for microscopical examination a great number of fragments of siliceous limestones and cherty nodules belonging to this series, and in a sample of black marble from Normanville he detected the remains of small organisms, which he supposed to be pteropods. In March last when Prof. David, Mr. C. C. Brittlebank of Victoria, and the

present writer were examining the glacial features of Inman Valley, opportunity was found to visit the outcrop from whence this interesting specimen had been obtained, with the result that *Archæocyathinæ* remains were discovered in the associated marbles. Prof. David was the first to recognise their occurrence on the weathered surface of the stone, and when once noted additional examples were soon found.

The locality where these remains were discovered is about three miles north of the Normanville Hotel, in a valley opening out to the sea, from which it is distant about half a mile. The place is easily fixed by the old Wheal Mary silver-lead mine, several disused shafts being on the immediate ground where the fossils were first discovered. The fossils are not very plentiful, so far as could be judged from the weathered surfaces of the limestone, and appear to run in narrow fossiliferous zones in the direction of the line of strike, such zones being repeated over a considerable width of outcrop. One of these coralline belts crosses the valley obliquely, passing very near one of the old mining shafts.

At Easter I was able to make a second visit to the spot when the fossiliferous belt was followed along a parallel line to previous observations, still further to the north-west, passing through the next lateral valley for a distance of a quarter of a mile when it was lost to view beneath a thick crust of travertine which covered the crest of the hill.

The fossiliferous beds form part of a very thick series of marbles, limestones, and calcareous shales which exhibit a close stratigraphical and lithological correspondence with the Sellick's Hill beds, to be referred to presently. Their outcrops form steep and rugged hills with only a slight amount of soil on their precipitous sides. The most characteristic lithological feature is a grey streaky cryptocrystalline marble which occasionally changes into a coal-black variety, and more rarely to a mottled red colour. Strings of arenaceous and ferruginous material more or less penetrate the limestones in irregular reticulating lines which stand in relief on the weathered surfaces. This heterogeneity of composition is unfortunate, in that it detracts from the value of the marble as an ornamental stone. The *Archæocyathinæ* are found in the grey marble, and are often difficult to distinguish from the matrix in which they are imbedded. It is highly probable that in some portions of the stone the organic remains have been obliterated by the metamorphic action that has converted the limestone into marble. The fossils occur in every stage of definiteness, and in many cases only the faintest evidences of organic structure has been preserved, the outlines shading off into the amorphous matrix.

The beds show a high angle of dip. In the Wheal Mary shaft, as seen from the surface, the dip reading was 65° W. 5° S. About

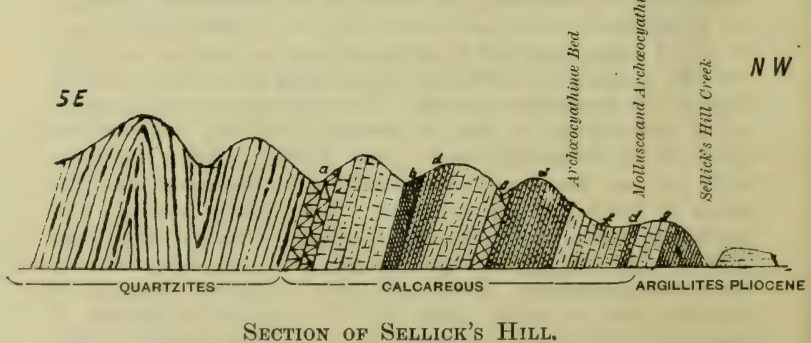
300 yards further up the valley the angle of dip increased to 81° with a due W. direction, and a little higher up again it was found to be 75° in a W.N.W. direction. In a gully about half a mile to the South-West the dip was taken by Mr. Brittlebank at 85° to the N.W.

Sellick's Hill.

In continuation of these researches, last month I visited Sellick's Hill, situated 32 miles to the South of Adelaide, with the hope of finding Cambrian fossils in the neighbourhood, the locality being in the line of strike of the Cambrian limestones of Normanville. The result exceeded my most sanguine expectations. Not only was the fossiliferous horizon easily discovered, but it proved to be much richer in organic remains than the outcrop at Normanville. The principal coralline belt is literally crowded with the remains of *Archæocyathinæ* throughout a vertical section of not less than 100 feet, and was traced in a continuous outcrop of equal richness and thickness for a distance of eight and a-half miles in a North-East and South-West direction.

The main road, in the gradient of Sellick's Hill, passes over the exposed beds nearly at right angles to the line of strike, and in a distance of about a mile and a-half rises to a height of 1,200 feet above sea level. The road cuttings therefore afford excellent sections of the geological features. The beds are much folded and crushed, exhibiting throughout a high angle of dip. These beds can be naturally divided on lithological grounds into three very distinct groups, which, in ascending order, are as follows: —Argillites, Limestones, and Quartzites.

In the following Sketch and Table will be found the leading features of the series as exposed in the road cuttings.



Section of Sellick's Hill.

Distance—One-and-a-quarter Miles.

1. Quartzites.—These occupy the higher elevations of the Ranges and are of great thickness, but sub-divided for the most

part into numerous thin beds. The stone is fine-grained and light-colored, and, where seen from a distance, its blanched boulders present the appearance of a limestone outcrop. The beds are folded into acute anticlinal and synclinal curves, the major anticlinal being about 500 yards in diameter where intersected by the road. The strike of the beds is E.N.E. and W.S.W. Dip S.S.E., nearly vertical.

II. Calcareous Group, including the following sub-divisions—

(a) Crystalline Marbles.—Near a sharp elbow of the road white and cream colored marbles are seen to rise from beneath the quartzites. These light colored, saccharoid marbles have a close resemblance to the "Ardrossan Marbles" of Yorke's Peninsula.

(b) Earthy Shales.—For the distance of half a mile the road runs closer to the line of strike, and passes obliquely over a succession of alternating earthy shales and limestones, the latter varying from a blue siliceous limestone to an earthy, flaggy limestone. Where the laminated earthy shales attain any considerable thickness they are generally crushed and flexured.

(c) Black Impure Limestone, with much earthy matter irregularly distributed throughout the mass, the siliceous portions weathering into brown patches and streaks on the face of the stone.

(d) Flaggy limestones. Dark-coloured limestones and earthy partings, regularly alternating in bands about one inch in their respective thickness. Outcrop serrated and very distinctive. Estimated thickness, 500 feet. Is persistent over many miles of outcrop. Dip, 70° to 76° E.S.E.

(e) Archæocyathinæ marble. Grey to bluish limestones and marbles, outcropping in large tabular masses, often level with the sward. Chiefly composed of *Archæocyathinæ* corals. Thickness about 100 feet.

(f) Impure limestone, more or less siliceous and earthy, including a thin belt of flaggy limestones, resembling *(d)*.

(g) Compact blue limestone. Locally known as "blue metal," and has been quarried in a small way for lime-burning. Sparingly fossiliferous, carrying small mollusca and occasional *Archæocyathinæ*. Several hundred feet in thickness.

III. Argillites. Grey, purple, and black argillaceous shale, which in places becomes more or less calcareous. Strongly jointed, breaking up into numerous rhomboid prisms. The stone

is bleached along lines of joints, but preserves a dark colour in the centre of the prismatic fragments. The grey shale is studded with numerous pellets of small dark-coloured calcareo-siliceous inclusions, which are most numerous in an important cliff section of the same beds seen on the coast at a distance of three miles to the south-west. Strike, N.N.E. and S.S.W. Dip, E.S.E. at 68°.

These argillaceous shales occupy the lowest horizon of the Cambrian rocks exposed in the section. They are seen, both at the base of Sellick's Hill and on the coast, to pass under a thick talus of Pliocene sands, clays, and gravels, which in the sea cliffs have a thickness of from 100 to 200 feet. On the coast these Pliocene beds rest upon gently-rolling Eocene limestones that, in places, are seen to be banked up against the face of the Cambrian shales.

The Fossiliferous Limestones.

The fossiliferous belt crosses the main road a few hundred yards above the Sellick's Hill Hotel, having a North-East and South-West direction. The outcrop follows the foothills, and can be traced for miles on either side of the road.

In a South-West direction fine exposures of the coralline belt are seen by the side of the road and in the adjoining paddock, occurring in large tabular surfaces, which are partially obscured by shallow soil or patches of travertine. At this point the stone is crowded with *Archæocyathinæ* through a vertical thickness of 100 feet. The outcrop can be followed with the greatest ease, the line of strike passing behind the, so-called, "Mount Terrible Farmstead,"* about two miles from Sellick's Hill. Here the soil is deep and cultivated, but large boulders of the fossiliferous marble have been removed, as obstructions to cultivation, to the fence line. The strike, as taken from the superior beds of flaggy limestones on the higher ground behind the farmhouse, was found to be N.E. and S.W. with a nearly vertical dip. The outcrop was followed in the same direction over saddleback hills and deep ravines for about four and a-half miles from the main road. At this extreme distance reached the stone was to all appearance equally as fossiliferous and as important in vertical development as at Sellick's Hill. The strike of the beds at this point is nearly parallel with the coast line, and heading towards Myponga Jetty and Normanville, which could be seen in the distance.

Retracing my steps to the main road, the fossiliferous limestones were followed in their North-Eastern Extension from Sellick's Hill. They are seen in the bed of the creek a little above the bridge where the stream crosses the road. Rising from

* The Mount Terrible of the official map is situated about four miles to the East of this point.

the creek, and on the hill behind the hotel, very massive surfaces of the coralline marbles occur as bare patches, very rich in corals. As in the outcrops on the Western side, the fossiliferous belt follows the course of the foothills, the geological strike having the same general trend as the Ranges.

In the second valley, after leaving the Sellick's Hill Creek, a very excellent section of the Cambrian beds is seen, although the coralline bed is locally denuded. The underlying grey and purple shales are exposed in high cliffs with a dip of 65° to S.E. These shales are overlain by a thick series of blue siliceous limestones, corresponding to the lower fossiliferous horizon, and include a wedge of impure limestone *(f)* and thin quartzite, which seem to have thickened in their easterly extension from Sellick's Hill. In the ascending order, where the *Archæocyathinæ* beds should put on, there are alluvial banks 70 feet high. Higher up the creek the flaggy limestones *(d)* form very high cliffs, which are hard near the surface, but decomposed at depth into soft ochreous beds.

On the rising ground and summit of the next hill the fossiliferous beds are obscured by a thick crust of travertine, but at the North-East slope of the hill there is an extensive exposure of the "blue metal," or lower limestone beds, and on the succeeding hill, both in ascent and descent, the coral beds show through the turf in numerous slabs, maintaining their highly fossiliferous character.

About three miles from Sellick's Hill an important exposure of these beds is seen in the bed of a creek and on the sloping sides of the valley, at a spot which can be easily located as being directly in the line of sight with a district road which runs as a straight line for miles in a northerly direction. The stream has cut the coralline bed at right angles, the latter occupying the bed of the creek for a distance of thirty yards. The overlying flaggy limestone gave the strike as N.E. and S.W., dip 58°. From this point the fossiliferous outcrop was followed for another mile, many good exposures being noted.

At five miles the lower bed *(g)* outcrops with very strong posts of compact limestone in a creek situated a little west of Mr. McBurney's homestead. The gathering darkness of evening prevented further geological observations at this interesting spot.*

The Flaggy Limestones.

The flaggy or earthy limestones which overlie the *Archæocyathinæ* marbles are very constant and characteristic over a long distance, and whilst the fossiliferous marbles are confined to the foot-hills, these overlying impure limestones, with serrated out-

* See Postscript.

crops, follow the crest of the subordinate hills on the Northern side of the Ranges. They occur at Normanville and throughout the eight or nine miles which were under observation near Sellick's Hill. One peculiarity of this bed is that near the surface it is hard and but slightly decomposed, showing only superficial pitting and relief lines, but at depth it is changed to a yellow ochreous earth, sometimes preserving its lines of stratification, and at times with the lines of bedding entirely obliterated. This is the case not only in the instance referred to in the creek section to the East of Sellick's Hill, but still more conspicuously in a gorge 200 feet deep on the South-Western side of Mount Terrible. At one place in the gorge, where there is a fine section of the beds, the latter have been much broken and crushed, large blocks having been turned at right angles to their natural position, the very distinct and thin partings in their stratification making a striking feature when thus broken and twisted. A similar occurrence of crush was noticed (probably on the same line of strike) in a tabular outcrop behind the Mount Terrible farmstead; large blocks, four or five feet square, were seen in juxtaposition with their strata at right angles to each other. These beds (as seen in the gorge referred to) are decomposed into yellow ochre from a few feet from the surface to the lowest point exposed. Dip 55° to 65° Westerly.

It is seldom that so clearly defined an outcrop with distinctive peculiarities can be followed for an equal distance, as is the case with the beds in question. The order of succession, viz., earthy shales, fossiliferous limestones, and flaggy limestones, occurs with equal clearness at Normanville and on the northern flanks of the Sellick's Hill ranges. So constant is this relationship of the beds maintained that it was an easy matter to tell at any moment my exact position on the section. With the "blue metal" outcropping on the one hand, and the calcareous flags with their serrated edges on the other, the coralline horizon was clearly defined even where temporally obscured.

Palæontological.

In the limited time at my disposal, in this rapid survey, but little attention could be devoted to the palæontological features of the rocks other than those which are visible on the weathered surfaces of the stone. The calcareous series, bounded by the argillaceous shales below, and the quartzites above, develop a thickness at Sellick's Hill roughly estimated at 1,800 or 2,000 feet. The fossiliferous portions are towards the base of the series, and are divided into two horizons, separated from each other by earthy limestones, in which no fossil remains were seen. The lower of these horizons is a very strong and comparatively pure

bluish limestone, several hundred feet in thickness. On the Sellick's Hill road these beds are largely covered with travertine, but are exposed in a small quarry close to the road, where the stone has been worked for lime-burning. Better sections of these beds can be seen in the creeks which traverse the outcrops further to the north-east. They are not conspicuously fossiliferous, and the stone is very compact, but in an hour's careful search in the Sellick's Hill quarry three small mollusca and a few *Archæocyathinæ* were obtained.

The upper fossiliferous horizon is a remarkable coralline bed, 100 feet in thickness. The calices of the anomalous *Archæocyathinæ* are crowded together in a manner that must have formed a true coralline reef in the Cambrian seas. The solidity and refractoriness of the matrix rendered it quite impossible to extract these corals from their bed, and the only method in which they can be successfully studied is by polishing and sectioning the rock in which they are entombed. Such a method of investigation is a work of time, and consequently the palæontological results await future elucidation.

The vertical range of the fossiliferous section in the beds marked "e" to "g" in the accompanying table is estimated at 800 feet.

This discovery of Lower Cambrian fossils in the Sellick's Hill Ranges gives a fresh interest to a reputed discovery of fossils in this neighbourhood mentioned by Tenison-Woods in his "Geological Observations in South Australia," p. 20, where, speaking of the Mount Lofty Ranges, he says :—"No fossils have been found except at one portion of the range, about thirty miles south of Adelaide. I was informed that the fossil was a *Pentamerus oblongus*. This would be characteristic of the lowest division of the Upper Silurian rocks. The person who found it is since deceased, so that the observation cannot be traced further or verified, unless new discoveries are made. With this exception ; if, indeed, it can be considered such, nothing is known of the age of the rocks on this range."

The locality indicated for this fossil by Tenison-Woods, although indefinite, is sufficiently precise to make it highly probable that it was obtained from some part of the Cambrian outcrop in the Sellick's Hill Range. The species mentioned is correctly referred to the Upper Silurian, a formation considerably higher in the geological scale than the one we are now dealing with. To explain the discrepancy, we must infer one of two things—either that fossiliferous beds higher in the geological series than the Lower Cambrian occur in the ranges, or otherwise the shell was wrongly determined. The latter is most likely to be the case. We have no information on whose judgment the

determination was made, and it seems more probable to conclude that some Cambrian shell was found, and incorrectly referred to *Pentamerus oblongus* than assume the hypothetical occurrence of a set of beds which are not known to exist in any part of the colony.

Compared with Other Lower Cambrian Localities.

The most Southerly extension of the Cambrian limestone hitherto known in the colony is in the Curramulka District, Yorke's Peninsula, in latitude a little North of Adelaide. The outcrop, which is generally inconspicuous, can be traced at intervals in a Northerly direction from Curramulka to Winulta Creek, a distance of 35 miles. The beds in this area, except at one locality, are but slightly disturbed, and when seen in section, exhibit slight undulations, with a dip usually from 8° to 15°. The exception referred to was observed by the present writer in February last, when an anticlinal axis of some importance was noted parallel with the coast a few miles South of Ardrossan. The Eastern limbs of this anticline can be seen one and a-half miles South of Rogue's Point, in a bold ridge of Ardrossan marble, 20 feet thick, dipping 40° E., as the beds pass out of sight below water level. We have thus the interesting fact that Lower Cambrian beds occupy portions of the coast line on both sides of Gulf St. Vincent, and the dip, respectively, is towards the trough now occupied by this arm of the sea.

Beds of Cambrian age have a great development in the Flinders Ranges, north of Quorn, probably extending nearly 200 miles in a north and south direction. Limestones with *Archæocyathinæ* occur in these ranges at several localities, representing in their extreme positions a geographical line of about 100 miles. The palæontological contents of these beds, as well as those of Yorke's Peninsula, have been elucidated by Prof. R. Tate* and Mr. R. Etheridge, jun.,† but our knowledge of the stratigraphical phenomena of the *Archæocyathinæ* marbles and their associated beds of the Flinders Ranges is very imperfect.

Geological Age of the Mount Lofty Ranges.

It is impossible to ignore the important bearing of this latest discovery of Lower Cambrian fossils on the geological age of the Mount Lofty Ranges. The general uniformity of strike and dip in the rocks throughout this extensive area has led to the opinion held by many that the hill country of the Southern portions of the province represents one great conformable series, and, on various data, its geological position has been commonly referred

* Trans. Roy. Soc., S. Aus., vol. XV. (1892), p. 183.
† *Ibid*, vol. XIII. (1890), p. 10.

to an Archæan, or at least Pre-Cambrian, age.* This hypothesis rested for support mainly on three considerations :—

1. Analogical. Rocks of Pre-Cambrian age are known to occur on Yorke's Peninsula, which exhibit lithological resemblances to many of the rocks in the Mount Lofty Ranges.

2. The discordance in the angle of dip between the Cambrian outcrops (especially those of Yorke's Peninsula) and that which is characteristic of the Mount Lofty Ranges.

3. The fossiliferous features of the Cambrian limestone, compared with the azoic features of the comparatively little altered and pure limestones which are abundantly developed in the Mount Lofty series.

It must be conceded that these considerations have been considerably weakened by the discoveries now placed before the Society, and requires a re-consideration of the whole question. The Cambrian beds at Sellick's Hill occupy a position which has been regarded as near the base of the Mount Lofty series, so that unless the accepted order of succession is to some extent reversed (or otherwise it can be proved that extensive faulting in the rocks has occurred) the Cambrian age of the Mount Lofty Ranges, as a whole, must be accepted.

With regard to the supposed analogy on lithological grounds the Pre-Cambrian rocks of Yorke's Peninsula are uniformly highly metamorphic and igneous in their features and have their analogues, in the Mount Lofty succession, only on the *eastern* flanks. The value of the analogical argument is entirely dependent on the assumption that the more highly metamorphosed beds of the eastern outcrops are *superior* in position, and therefore newer in point of age, to the less altered beds of the western side. For, otherwise, if they underlie instead of overlie the latter, they probably represent an older uncomformable series with the less altered shales, quartzites, and limestones of the western portions as a newer, or Cambrian, formation.

Again, little weight can be given to the consideration of discordance in angle of dip when we take into account that the Cambrians near Ardrossan pass rapidly from a dip of 15° to 40°, and in the Sellick's Hill outcrop in a series of anticlinal and synclinal folds with angles of dip varying from 60° to 90°

Further, the discovery of characteristic fossils in these ranges has not only clearly defined the geological age of the beds in

* As an exception to this opinion, Mr. H. Y. L. Brown, Government Geologist, in his geological map of the colony (1886), divided the Mount Lofty Ranges into three main geological divisions, marked by the degree of metamorphism exhibited. In descending order the divisions are represented as follows :—1. Palæozoic (Lower Silurian). 2. Palæozoic, or Azoic. 3. Archæan.

which they are found, but has thrown doubt on the assumption that the azoic features of the Mount Lofty beds in general are due to a question of age.

The point that awaits determination now is—Are the fundamental rocks of the Mount Lofty Ranges comprehended in one great Cambrian system, or are these rocks divisable into a newer and an older series, a Cambrian and a Pre-Cambrian formation? If the latter, then we must find some line of unconformability by fault or otherwise.

Professor Tate has suggested the probability of a great fault existing in these old rocks somewhere in the vicinity of Adelaide. I believe he has been led to an inference of that kind partly from the great depth of the bed rock in the Croydon bore, amounting to 2,000 feet. The same rocks in the Adelaide bore were proved at a depth of 360 feet, which indicates a gradient of 1,640 feet in a distance of about three and a-half miles. It is not impossible that erosive agencies may be responsible for so great a difference of level, and evidence is not wanting to prove a similar rapid descent of the old rocks below the plains on the eastern side of the ranges,* yet the phenomenon at Croydon is a remarkable one, and may give the clue of a great crust movement, the confirmation of which must be looked for in our hill country. A great downthrow of the beds is capable of preserving outliers of a newer formation, and in this way it is not impossible that Cambrian beds may, by faulting, be thrown against a face of Pre-Cambrian rocks. This is one of the problems which the present discoveries have raised, and which can only be settled by careful and extended observations in the field.

At present no such line of fault is known to exist, and there are some stratigraphical features which seem to indicate that the fossiliferous beds described in this paper are interstratified and conformable with the great geological system of the hills. We have, for example, in the Normanville and Sellick's Hill district a continuous outcrop of Lower Cambrian rocks for a distance of over twenty miles. The general strike and dip of these beds are homologous with that which characterise the hill country in general, and the lithology of the beds bears a close resemblance to the shales, limestones and quartzites of the central and Western parts of the ranges.

As bearing upon the present discoveries, special interest centres in a wide belt of limestones that takes in Brighton, Field River, Reynella, and Noarlunga. These beds vary in composition

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* A bore put down at the Pine Hut Creek, on the Murray Flats, within a quarter of a mile of the foot of the hills had to penetrate a depth of 530 feet before reaching the bed rock.

from dolomitic to siliceous and relatively pure limestones.* No marbles such as are found at Normanville and Sellick's Hill are known to occur in this series, and from a number of transparent sections of the limestones of Brighton and Hallett's Cove, made by Prof. David, it has been shown that the minute structure of the stone is largely oolitic. The blue limestones of the last named localities bear a close resemblance to the "blue metal" beds of the Sellick's Hill section, but with the exception of casts of Radiolaria† no fossils have been detected in the Brighton limestones. It is a matter of great interest as to whether the Brighton and Noarlunga limestones are comprehended in the same geological formation as those of Sellick's Hill or not. The former follow a general line of strike almost due North and South, whilst the strike of the latter is from N.E. and S.W. to N.N.E. and S.S.W. This slight discordance of strike in the respective beds is not inconsistent with conformability, but, taking the prevaling southeasterly dip into account we must place the Brighton beds on a somewhat lower geological horizon than the Sellick's Hill beds.

Selwyn notes in his geological map an extensive anticline running nearly paralliel to the coast along the Aldinga Plains. This anticline can be traced from Brighton to Normanville, and is marked by a westerly dip on the coast with a general southeasterly dip a few miles inland. This anticlinal area is characterised by remarkable local contortions and overthrusts. It is important to note that these crust movements have included the Cambrians and the foot-hills of Mount Lofty in the same great system of foldings.

The discovery now recorded imparts new interest to the geology of the Hills as a whole, and incites to fresh zeal in searching for such evidences as will eventually unravel the connected story of the origin and development of the great mountain system which forms the geological axis of the colony.

Postcript.

Since reading the above paper I have revisited the neighbourhood of Willunga and followed the outcrop of the Cambrian limestones for several miles beyond the point where left on my previous visit.

Three miles south-west of Willunga, on Section 545, owned by Mr. Culley, sen., the calcareous beds, without making a bold feature, crop out strongly along the foothills. They include the siliceous limestones, flaggy limestones, and overlying quartzites

* These limestones have, in part, been described by Prof. T. W. E. David and W. Howchin, in a joint paper. Proc. Linn. Soc. N.S.W., p. 571, 1896.

† Op. cit. ante.

characteristic of the series with a S.W. and N.E. strike. Dip, S.E., at 45° to 50°. A marked feature of the beds at this point is the thickening of the wedge of flaggy quartzites, which first appear towards the base of the calcareous series near Sellick's Hill, and, thickening as they extend eastward, split the limestones into an upper and lower series.

The lower limestones are well exposed in the next creek, situated a little south-west of Mr. McBurney's homestead, as mentioned in the paper (p.), but the calcareous belt is not seen again until Willunga is reached. At the latter place the limestones are once more bared on the hills behind the town, where the stone is a close-grained white marble, with small crystals of pyrite. From this point the outcrop is clearly defined for several miles, following the foothills, and has been quarried by Mr. F. G. Culley, through whose land the limestone passes. Dip, 60° S.E. It is difficult to tell the exact thickness of the beds, as they are more or less obscured by turf, but the width of visible outcrop varies from 150 to 250 yards.

At Springbrook, two and a-quarter miles from Willunga, the stone has been extensively quarried for road metal. Here the limestone is a dark "blue metal," intercalated with thin earthy shales, and has a dip of 50°. This was the furthest point visited, but the outcrop was visible for a distance of three-quarters of a mile still further to the North-East.

No fossils were seen in this journey, but the limestones in some places included numerous circles filled with radiated crystals of calcite that may possibly represent the cups of *Archæocyathinæ*, although no structure could be detected. I was told, however, by Mr. Brown, the owner of the Springbrook Quarry, that shells had been occasionally seen in the quarry when breaking the stone.

These extended observations have determined the outcrop of the Cambrian beds for a further six miles beyond that mentioned in the paper, or about 25 miles in all, and when last seen the beds were in a line of strike that was directed into the heart of the Mount Lofty Ranges.

My thanks are due to Mr. F. G. Culley, of Willunga, who kindly acted as guide, and facilitated my observations in the Willunga neighbourhood.

September 2, 1897.

On a New Atriplex from South Australia.

By J. H. Maiden, Director of the Botanic Gardens, Sydney, Corresponding Member.

[Read September 7, 1897.]

Atriplex Kochiana, *Maiden.*

A dicecious, occasionally monœcious, erect perennial (or annual with a woody base?) about one to one and a-half feet high, with very angular branches; the whole plant grey with a scaly tomentum. Male flowers in terminal interrupted paniculate spikes, leafy at the base; female flowers in axillary clusters, the upper ones often with a few male flowers. Leaves rather thick, narrowed into a short petiole, ovate-rhomboidal in outline, irregularly sinuate-lobed or almost entire, the largest about one and a-half inches long. Fruiting-perianth nearly sessile, strongly veined as in *A. vesicarium*, two-lobed to near the base, the segments narrow-reniform, twice as broad as long, almost truncate at the top, but slightly denticulate, with two large thick, nearly basal ovate-lanceolate appendages fully twice as long as the calyx-segments.

It is nearest allied to *A. vesicarium*, Hew., which it much resembles in habit and foliage, and from which it is chiefly distinguished by the short and broad segments of the fruiting-calyx, which are scarcely half as long as the dorsal appendages. It is also allied to *A. Quinii*, F. v. M. (in *Victorian Naturalist*, November, 1888), but distinguished from that species chiefly by the much longer appendages of the calyx-segments, the broader leaves, and more herbaceous habit.

Thinly distributed in the vicinity of Mount Distance, near Mount Lyndhurst, *viâ* Farina, South Australia.—Heinrich Ludwig Max Koch, July, 1897.

Named in honor of Mr. Koch, a very intelligent collector, and transmitted to me by Mr. Albert Molineux, F.L.S., General Secretary of the Agricultural Bureau of South Australia.

This large-leaved *Atriplex* is doubtless a valuable fodder plant (it is reported that "it is much liked by stock") and steps will be taken to have it propagated, with the view to experiments being made in this direction.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 5, 1897.]

XXII.

CUCUJIDÆ.

PROSTOMIS.

P. intermedius, sp. nov. Statura *P. Atkinsoni*, Waterh.; rufo-brunneus, nitidus; antennis brevibus, articulo 3° minus elongato; capite prothoraceque sparsim subtilissime punctulatis; elytris subtiliter punctulato-striatis; jugulæ calcaribus lateralibus antice approximatis. Long., 3—4 l.; lat., $\frac{3}{5}$—$\frac{3}{4}$ l.

With antennæ resembling those of *P. cornutus*, Waterh., this species has its jugular processes like those of *P. Atkinsoni*, Waterh.

Victoria and N.S. Wales.

PECTINICORNES.

AULACOCYCLUS.

A. collaris, Blackb. In describing this species (Tr. Roy. Soc. S.A., 1896, p. 233) I omitted to state that its habitat is N. Queensland.

LAMELLICORNES.

APHODIUS.

A. Victoriæ, sp. nov. Minus elongatus; minus nitidus; pubescens; colore variabilis, capite prothoraceque nigris vel nigro-piceis, elytris lividis longitudinaliter plus minusve piceo-notatis, corpore subtus nigro-vel brunneo-piceo, pedibus lividis plus minusve picescentibus; capite prothoraceque crebre subgrosse subrugulose punctulatis, illo antice reflexo; prothorace sat transverso postice haud (vel vix manifeste) marginato, lateribus minus arcuatis, angulis posticis fere rectis, disco postice leviter canaliculato; elytris striatis, interstitiis alternis sat convexis.

Maris prothoracis lateribus postice sinuatis, capite antice truncato, tibiis anticis gracilibus extus bidentatis.

Feminæ prothoracis lateribus postice fortiter emarginatis, capite antice fere æqualiter rotundato, tibiis anticis minus gracilibus extus tridentatis. Long., $2\frac{1}{2}$—$2\frac{4}{5}$ l.; lat., $1\frac{1}{2}$ l. (vix).

The markings on the elytra resemble those of *Aphodius sus*, Fabr., but are on the non-costate interstices.

The species may perhaps be placed in the genus not far from *A. sus;* it is allied to *A. lindensis*, Blackb., which is founded on a female example, the male probably presenting characters similar to those of the present insect. The mesosternum is gently carinate. The prothorax is almost without trace of a basal margin and the lateral margin is not continued along the edge of the emarginate portion of the prothorax in the female (in *lindensis* this emarginate portion is margined).

Victoria; Black Spur; also sent by Mr. J. A. Kershaw, of Melbourne.

PROCTAMMODES.

P. minor, sp. nov. Subovalis; nitidus; niger, palpis tarsisque plus minusve rufescentibus; capite subtilius crebre (in medio magis sparsim) haud rugulose punctulato, paullo pone marginem anticum obtuse gibbo (hoc antice emarginato); prothorace leviter transverso, postice canaliculato, fortiter minus crebre punctulato; elytris crenato-striatis, interstitiis convexis sparsim subtiliter punctulatis; tibiis anticis extus tridentatis. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

Much like *P. sculptus*, Hope, but notably smaller, with the head much more sparsely, finely, and smoothly punctulate and having its surface even except that it is feebly and obtusely gibbous in the middle behind the base of the clypeus. This genus is most easily distinguished from *Aphodius* by the basal joint of its front tarsi being the longest joint, reaching almost to the apex of the apical spur of the tibia. In this character it resembles *Atœnius* but differs from the latter *inter alia* by the structure of the hind tibiæ being of the *Aphodius* type.

Victoria; several localities; also sent by Mr. J. A. Kershaw.

DIPHUCEPHALA.

D. Kershawi, sp. nov. Mas. Viridis, antennis (clava nigra excepta) testaceis, tarsis cyaneis; breviter minus perspicue setosa; capite prothoraceque confertim subtiliter punctulatis et reticulatim subtiliter areolatis; illo sat plano antice recurvo et profunde emarginato, angulis anticis extrorsum paullo directis; prothorace quam longiori paullo (ut 8 ad 7) latiori, longitudinaliter et transversim late sat profunde sulcato (sulco longitudinali postice haud bifido, transverso

sat continuo), antice parum angustato, lateribus bisinuatis in medio dente acuto armatis, angulis dentiformibus; elytris subfortiter subseriatim rugulose punctulatis et sat fortiter bicostatis; corpore subtus albo-piloso; tarsis posticis gracilibus. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{5}$ l.

Fem. latet.

In Sir W. Macleay's classification of the *Diphucephalæ* this species falls into the second division of subsection B in Section II. The close fine puncturation of its prothorax separates it at once from all the species that have been attributed to that aggregate except *D. prasina*, Macl. and *D. laticollis*, Lea. Its remarkably elongate prothorax but little narrowed in front separates it readily from those two insects (presuming from the name that *D. laticollis* has a strongly transverse prothorax, the character is not mentioned in the description). It considerably resembles several species in others of Sir W. Macleay's aggregates, *e.g.*, *purpureitarsis*, Macl. and *pygmæa*, Waterh, but these have *inter alia* the prothoracic furrows quite different. *D. purpureitarsis*, Macl., has similar prothoracic sculpture (*i.e.* fine close puncturation and a network of very fine scarcely elevated lines) though with the reticulation less marked. The following characters in combination are sufficient, I think, to distinguish this from all other described *Diphucephalæ*—prothorax very little wider than long and not much narrowed in front, with its longitudinal sulcus simple and its transverse sulci reaching the middle of the segment. The hind tarsi in this species are much more slender and elongate than in any other *Diphucephalæ* known to me, and the basal two joints are of equal length *inter se*. The structure of the hind tarsi furnishes very important characters for the distinction of species in this genus and seems to have been unaccountably overlooked hitherto by describers.

Victoria; sent by Mr. J. A. Kershaw.

PACHYGASTRA.

P. Victoriæ, sp. nov. Ovata; subnitida; nigra, pedibus picescentibus, antennis (harum clava triarticulata) palpisque subferrugineis; subtus et in pedibus ferrugineo-hirsuta; capite crebre aspere (clypeo hoc antice rotundato margine recurvo, minus crebre haud aspere) punctulato; prothorace vix canaliculato, fortiter transverso, antice fortiter angustato, ut caput punctulato, lateribus fortiter dilatato-rotundatis; scutello punctulato; elytris fortiter vix geminatim punctulato-striatis, interstitiis sparsim punctulatis; pygidio crebre subtiliter punctulatis; tibiis anticis late dilatatis, extus obtuse bidentatis.

Maris quam feminæ antennarum clava magis elongato (quam articuli ceteri conjuncti vix breviori) segmento ventrali penultimo breviori. Long., $6\frac{1}{2}$—$7\frac{1}{2}$ l.; lat., $3\frac{1}{2}$—$4\frac{2}{3}$ l.

Agrees with *P. tasmanica*, Germ. in its labrum projecting in a plane parallel with, but considerably below the level of, that of the clypeus and its remarkably dilated (externally bidentate) front tibia which resembles those of the *Dynastid* genus *Cheiroplatys*. The above two characters in combination I take to be the essential characters of *Pachygastra*. The antennæ differ much from those of *P. tasmanica* (which have a 6-jointed club, at any rate in the male), but the difference is not greater than occurs in the antennæ within the limits of allied genera *(e g. Colpochila)*. Specifically it is much smaller than *tasmanica* and differently colored, with its elytra strongly punctulate-striate.

Victoria; sent by Mr. French.

ASEMANTUS.

A. subæqualis (? Hope). In describing this species (Tr. Roy. Soc., S.A., 1896, p. 249) I omitted to mention its size, which is, long., 9—12 l.; lat., $4\frac{4}{5}$—6 l.

PIMELOPUS.

P. Sydneyanus, Blackb. In describing this species (Tr. R.S., S.A., 1896, p. 256) I omitted to mention its size, which is, long., 9—11 l.; lat., 5—6 l.

CLERIDÆ.

STIGMATIUM.

S. bimaculatum, sp. nov. Piceo-nigrum, capite elytrorum duabus quintis basalibus antennis sternis coxis abdominisque basi plus minusve rufescentibus, elytris ante apicem maculis singulis testaceis fere circularibus ornatis; capite et elytrorum maculis pilis albidis sat dense vestitis, prothorace elytris ad basin et apicem pedibusque setis erectis elongatis sparsius ornatis (his in prothorace nigris in elytris pedibusque albidis), elytrorum ceteris partibus setis minus elongatis (his ut superficies coloratis) instructis, sternis sat dense sat breviter albido-pilosis; oculis inter se modice approximatis; antennis modice elongatis, articulorum singulorum latitudine majori prope apicem posita; prothorace paullo ante medium transversim sinuatim sulcato, trans basin transversim bisulcato, subtiliter sat crebre punctulato; elytris in duabus quintis basalibus punctulato-striatis (interstitiis convexis granulatis), in cetera parte sparsim seriatim minus perspicue granulatis. Long., 4 l.; lat., $1\frac{1}{4}$ l.

Resembles *S. Gilberti*, from which it differs *inter alia* by the red basal piece of the elytra not extending so far hindward and having its hindmargin not (or only very narrowly) clothed with dense pubescence, by the black apical piece of the elytra being less evidently granulose, and by the subapical spot on each elytron being (not an obliquely placed oval mark but) almost perfectly circular. *S. dispar*, Kuwert, appears to be distinguished from this species by the hinder part of the elytra being punctulate-striate, and *Victoriæ*, Kuwert, by the front part of the elytra being black. The other described species seem to differ by structural characters that may be regarded as subgeneric, especially by the shape of the joints of their antennæ.

W. Australia.

BOSTRICHIDÆ.

XYLOPERTHA.

X. hirticollis, sp. nov. Sat nitidus; ferrugineus, prothorace sternisque obscuris; capite utrinque supra oculos pilis elongatis crispatis densissime fimbriato; antennis 10-articulatis, articulis ultimis 3 conjunctis quam ceteri conjuncti manifeste longioribus; prothorace subcylindrico sublævi sed in parte antica sat grosse granuloso-ruguloso et in margine antico utrinque (ut caput) densissime pilis elongatis vestito; elytris obsolete nec crebre nec seriatim punctulatis, postice oblique parum abrupte subtruncatis, parte declivi a medio retrorsum carina cincta, sutura postice leviter cariniformi, angulo suturali acuto sat prominulo; segmentis ventralibus penultimo antepenultimoque fortiter emarginatis (ultimo magno subcompresso); tarsis posticis sat elongatis, articulis basalibus 3 valde compressis (articulo basali brevissimo, 2° 3° 4° que conjunctis longitudine sat æquali, 3° quam 4us triplo longiori, 5° 3° longitudine sat æquali; tibiis anticis (intermediis exempli typici carentibus) extus sat fortiter denticulatis. Long., $1\frac{4}{5}$ l.; lat. $\frac{4}{5}$ l.

I have no doubt that the specimen described above is a male. It is easily recognizable by the remarkable shaggy and curled pilosity on its head and prothorax. Each mass of hairs is about as long as one of the antennæ. The masses are placed one on either side of the head running longitudinally, and one on either side of the front margin of the prothorax running transversely. The penultimate and antepenultimate ventral segments are strongly and widely emarginate, so that their hind margins in the middle are very close to each other and to the preceding segment, but much farther apart on the sides. The strong compression of the basal part of the hind tarsi and the denticulation of the front (and perhaps also the intermediate) tibiæ are also noteworthy characters.

Roebuck Bay, W. Australia; sent by Mr. French.

TENEBRIONIDÆ.

EXANGELTUS, gen. nov. *(? Scauridarum).*

Ligula sat producta; mentum subquadratum planatum setosum; palporum articulus ultimus securiformis; caput subtus ante oculos profunde transversim sulcatum; labrum modicum horizontale antice dense ciliatum; caput declive pone oculos parum angustatum; oculi sat convexi minus angusti sat grosse granulati antice emarginati; antennæ sat graciles sat elongatæ filiformes, articulo 2° brevi, 3° quam 4us 5us que conjuncti vix breviori, 10° quam 9us sat minori, 11° minimo subglobulo; prothorax antice et ad latera vix marginatus quam elytra multo angustior; elytra convexa sat angusta quam prothorax circiter quadruplo longiora ad latera vix perspicue marginata; prosternum ante quam pone coxas vix magis productum, parte mediana postice sat recurvo; mesosternum sat angustum declive; metasternum elongatum; segmenta ventralia 3um 4um que postice haud coriaceo-marginata; coxarum intermediarum trochantina manifesta; pedes minus elongati minus robusti; tarsi subtus pubescentes, posticorum articulo basali apicali longitudine sat æquali; corpus setis brevibus adpressis minus crebre vestitum.

The insect on which this genus is founded is an extremely perplexing one. I received it from Central Australia many years ago and have never been able to make up my mind where in the *Tenebrionidæ* to place it. Most of its characters associate it with the "Tribes" that form the first "Cohort" of the second "Section" in M. Lacordaire's arrangement, but I have felt great difficulty in placing it among them on account of its tarsi pubescent beneath and the structure of its prosternum which is such that the front margin of the front coxæ is scarcely further from the front margin of the prosternum than the hindmargin of the same coxæ is from the hindmargin of the prosternum. Lately I have submitted an example to that accomplished specialist in the *Tenebrionidæ* Mr. G. C. Champion and with his usual courtesy he has written me his opinion that it ought to be placed in the "Cohort" to which I was disposed to refer it, pointing out a character confirming it in this position, the importance of which seems to have escaped the attention of M. Lacordaire; viz., the absence of a coriaceous hindmargin to the third and fourth ventral segments. Mr. Champion thinks it in some respects allied to *Asida* (belonging to a "Tribe" not hitherto known as Australian) though of entirely different facies, and also notes its relationship to *Nyctoporis*,—near which (and therefore, according to M. Lacordaire's arrangement, in the Tribe *Scaurides*) I had myself been inclined to think it seemed least out of place. I

therefore, though not without hesitation, assign it to that position in order to bring forward a description of it.

E. angustus, sp. nov. Nigro-piceus; opacus; anguste elongatus, modice convexus (*Tenebrionem molitorem*, Linn., forma nonnihil simulans); prothorace transverso, antice parum emarginato (quam postice paullo angustiori), longitudinaliter confertim æqualiter strigato, lateribus antice sat arcuatis postice subrectis, angulis posticis dentiformibus retrorsum directis; elytris sat parallelis quam prothorax sat latioribus, striis circiter 17 crebre punctulatis instructis, interstitiis angustis sat cariniformibus; corpore subtus crebre sat fortiter punctulato. Long., $5\frac{1}{4}$ l.; lat, $1\frac{7}{10}$ l.

The close striation of the elytra (about 17 striæ on each elytron) is a notable superficial character.

Central Australia; McDonnell Ranges; taken by Mr. Wild.

OSPIDUS.

O. gibbus, sp. nov. Latus, fortiter convexus; nitidus; rufo-brunneus, elytris sparsim parum manifeste fusco-maculatis, antennis apicem versus piceis; capite subtilius sat crebre punctulato; prothorace fortiter transverso, longitudinaliter vix manifeste canaliculato, disco subtiliter sparsim punctulato, lateribus late planatis transversim rugatis; scutello sublævi; elytris subfortiter sat crebre vix subseriatim punctulatis, parum perspicue 3-costatis. Long., 8 l.; lat., 5 l.

Larger than *O. chrysomeloides*, Pasc., more nitid, more convex, and differently colored; also the prothorax is more sparsely punctured on the disc with its lateral portions much more flattened (they are scarcely flattened at all in *chrysomeloides*), wider, and more rugulose, and the lateral flattened part of the elytra is wider and less rugulose.

As I did not feel sure that my example of Mr. Pascoe's species was correctly named from his description, I have sent an example of this insect to Mr. Champion (who has access to Mr. Pascoe's types) and he reports it quite distinct from *O. chrysomeloides*.

N. Queensland; sent by Mr. French.

MELANDRYIDÆ.

PAROMARTEON, gen. nov. *(? Melandryidarum).*

Caput breve transversum; oculi modici convexi, sat fortiter granulati; palporum maxillarium articulus apicalis sat parvus antice oblique truncatus; mandibula ad apicem bifida; antennæ sat breves robustæ (articulo 3° quam 2us perspicue longiori 4°—10° sat æqualibus fere transversis, 11° quam precedentes manifeste longiori); pronotum transver-

sum, a prosterno carina haud distinctum ; quam caput paullo latius, lateribus fortiter rotundatis, angulis fere nullis ; scutellum modicum fortiter transversum ; elytra quam prothorax latiora sat elongata ; coxæ anticæ longitudinales inter se fere contiguæ postice late apertæ ; coxæ intermediæ longitudinales inter se sat approximatæ ; coxæ posticæ inter se sat approximatæ ; processus intercoxalis angustus brevis ; pedes modici, tibiis ad apicem minute mucronatis, tarsorum posticorum articulo basali ceteris conjunctis longitudine æquali (3° breviter bilobo) ; forma nonnihil *Telephorum* simulans ; corpus supra capillis erectis minus elongatis crebre vestitum.

This is another perplexing Heteromerous insect on which I have asked the opinion of Mr. Champion. He thinks it must be a *Melandryid* near *Trichosalpingus*, which when I characterised it I referred with much hesitation to the *Pythidæ* noting that its tarsal structure was not of the *Pythid* type. Its tarsi are *Melandryid* in character, but its pronotum not divided by a carina from the prosternum excludes it (according to M. Lacordaire) from the *Melandryidæ*. Mr. Champion however evidently considers that the tarsal rather than the prothoracic structure should be the determining character (and I regard his opinion as very conclusive) as he refers *Trichosalpingus* to the *Melandryidæ*. There is no doubt of *Trichosalpingus* and *Paromarteon* being structurally near each other—although they are superficially very unlike, the former having an apparent *Pythid* aspect and the latter a facies more suggestive of a *Telephorid*.

P. mutabile, sp. nov. Sat nitidum ; capite prothoraceque rufis, elytris pedibusque (tarsorum apice piceo excepto) testaceis, corpore subtus (prosterno excepto) antennisque (basi testacea excepta) piceis ; nonnullorum exemplorum capite elytrisque plus minusve vel omni no picescentibus ; capite prothoraceque subtiliter sparsissime, elytris sat crebre minus subtiliter, corpore subtus sparsim minus perspicue, punctulatis. Long., $1\frac{4}{5}$ l. ; lat., $\frac{3}{5}$ l.

Victoria ; Alpine Region.

SCRAPTIA.

S. lunulata, sp. nov. Minus elongata ; minus nitida ; sat longe pubescens ; piceo-brunnea ; in elytris macula communi antemediana sublunata et apice toto, antennis, pedibusque, sordide testaceis ; oculis sat magnis grosse granulatis ; antennis elongatis sat gracilibus, articulo 3° quam 2us fere duplo longiori 4° longitudine sat æquali ; prothorace fortiter transverso, cum capite æqualiter crebre subfortiter aspere punctulato, angulis posticis acutis, basi media late lobata ; elytris

quam prothorax parum fortius vix magis aspere punctulatis. Long., $1\frac{1}{2}$ l. ; lat., $\frac{1}{2}$ l.

This is another species that I have referred to Mr. Champion. He reports that in spite of its considerably different facies from that of a typical *Scraptia* he does not see much in the way of structure on which to found a distinct genus. Failing to discover any such distinction myself, I have no hesitation therefore in attributing the insect to *Scraptia*.

N. Queensland ; sent to me by Mr. Koebele.

CURCULIONIDÆ.

CUBICORHYNCHUS.

C. tortipes, sp. nov. Mas. subovalis, postice truncatus ; niger, squamis parvis silaceis (exemplis visis fere omnino abrasis) et setis sparsis brevibus minus perspicuis albidis vestitus ; capite postice sparsim granulato, supra oculos crista parva acuta instructo ; antennarum clava longe pediculata ; rostro minus lato supra costis obtusis nonnullis instructo, antice profunde triangulariter impresso (partis impressæ marginibus lateralibus cariniformibus) ; prothorace quam longiori vix latiori, pone apicem transversim anguste fortiter impresso et longitudinaliter linea subtili distincte notato (his canalibus fere ut *C. calcarati*, Macl.), crebre æqualiter granuloso (ut *C. occulti*, Sloane), lateribus fortiter dilatato-rotundatis ; elytris supra planatis, postice perpendicularibus, ad latera planis perpendicularibus (vel potius deorsum convergentibus), sat fortiter striatis, interstitiis transversim striatis et subseriatim granulosis (granularum magnitudine maximam partem ut *C. occulti*, Sloane, sed in interstitii 5ⁱ parte ante-apicali sat majori); coxis anticis inter se sat remotis ; femoribus anticis basin versus fortiter curvatis ; tibiis anticis fortiter, posticis paullo minus fortiter, falciformibus ; tibiis intermediis sat fortiter flexuosis. Long., 7 l.; lat., 3 l.

Fem. latet.

This is the most remarkable *Cubicorhynchus* yet described I think and can hardly be identical with any hitherto named ; for, although some of them are so briefly and vaguely characterised as to be incapable of certain identification, it is doubtless safe to assume that no describer could have passed over without remark the extraordinary shape of the legs and the elytra if he had had this insect before him. Looked at from directly above the present species appears to be sharply truncate at the commencement of the posterior declivity of the elytra, while looked at from directly behind (or obliquely from in front)

the upper outline of the elytra across the commencement of the posterior declivity is distinctly concave, while the lateral part of the elytra descends so abruptly that in the hinder part the 5th interstice appears as the line of contact between two planes placed at a right (or even slightly acute) angle to each other. The extraordinary strongly pediculated and bent front femora, and the remarkable shape of all the tibiæ as well as the strangely shaped antennal club (with a pedicle scarcely shorter than the dilated apex) also furnish unmistakeable characters, and the sculpture of the elytra (especially their transversely furrowed appearance almost as in *Sclerorhinus rufipes*, Blackb.) is also noteworthy. Probably the structural characters of the female are very different, but no female has been described in terms that seem to associate it with the male before me.

W. Australia; Upper Murchison R. district; sent by Mr. French.

LONGICORNES.

PENTHEA.

P Mastersi, sp. nov. Mas. Dense pubescens et sparsissime nigro-setulosa; pube albida ochraceo-variegata et passim maculis parvis nigris ornata; antennis quam corpus parum longioribus, subtus sparsim capillis nigris fimbriatis, articulo 3° quam 4us vix longiori, articulis 1° 2° que griseis nigro-maculatis (ceteris piceis ad basin et ad apicem anguste griseis); capite inter antennas leviter concavo, linea subtili integra longitudinali media impresso; prothorace transverso, pone medium leviter transversim sulcato, ante sulcum transversim 6-tuberculato, pone sulcum utrinque tuberculo parvo obtuso armato; scutello transverso postice subtruncato; elytrorum sculptura sub pubem fere abdita (costis 3 manifeste apparentibus, internis 2 ante medium desinentibus), granulis nonnullis prope basin exstantibus, apicibus subtruncatis. Long., 7 l.; lat., $2\frac{1}{2}$ l.

This species is I think congeneric with certain small Longicorns which Mr. Pascoe described as forming a distinct section of *Penthea* (*P. scenica*, *melanosticta*, &c.). Mr. Pascoe associated with them *P. picta*, which differs from *P. scenica*, &c., in being clothed with long fine hairs and having very finely granulated eyes, and which should I think be placed in *Corrhenes*; and I should judge from the descriptions that *P. crassicollis*, Pasc., and *sectator*, Pasc., should also be referred to *Corrhenes*. The present insect is of narrower form than *P. scenica* and *melanosticta* from both of which it also differs *inter alia* in having a well-marked transverse sulcus on the prothorax *behind* the middle (so well marked that its extremities viewed from above look like emargin-

ations of the lateral margins) in addition to the usual transverse depression *in front of* the middle. From *P. macularia*, Pasc. (which I know only by description) it seems to differ by the presence of ochraceous pubescence, of a well-defined longitudinal line on the head, and of evident elytral costæ, as well as by the absence of a smooth glabrous line on the prothorax; from *P. miliaris*, Pasc., by the presence of white as well as *ochraceous* pubescence on the elytra, the shape of the scutellum, &c.; and from *P. pullina*, Pasc., by its elytra not having "two prominent costæ marked at intervals by coarse tubercles." Its colours and markings are as follows:—on a ground of whitish pubescence ochraceous pubescence occupies the hind part of the head, runs forward between the antennæ (not extending to the eyes) and spreads out on the front of the antennal tubers, is distributed in a kind of linear reticulation on the prothorax and runs similarly over the disc of each elytron but is almost absent on the marginal sutural and apical portions; the whole upper surface is studded with small black spots (evidently smaller than those of *P. melanosticta* and much smaller than those of *P. scenica*) which on the front of the elytra are raised granules but elsewhere are even with the general surface.

N.W. Australia; sent by Mr. Masters.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1896-97.

ORDINARY MEETING, NOVEMBER 3, 1896.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., laid on the table a case of *Lepidoptera*. Dr. MORGAN exhibited a large collection of birds in illustration of his paper.

OBITUARY NOTICE.—The President referred in feeling terms to the loss science had substained in the death of Baron F. von Mueller ; and it was decided to place a minute on record testifying to the high value of his achievements in the fields of science.

IMPORTANT DISCOVERY.—The President announced that Prof. David, of the Sydney University, had discovered fossils, *Radiolaria*, in black cherty bands in silicious shales at Crystal Brook, S.A. These rocks had previously been considered of Archæan age.

ELECTION OF HON. SEC.—G. G. Mayo was elected an additional Hon. Sec., vice W. B. Poole resigned.

PAPERS.—"List of Birds in the Neighbourhood of Laura, S.A.," by Dr. Morgan. "Corrosion of Brass Pins in Entomological Specimens," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, APRIL 6, 1897.

WALTER HOWCHIN, F.G.S. (President), in the chair.

EXHIBITS. — Prof. TATE, F.G.S., exhibited the following minerals : — *Plumosite*, the capillary form of *Jamesonite ; Monazite*, the source of *cerium* and *lanthanum ;* an unnamed form of calcic borate, possibly an anhydrous form of *Bechelite ; Coquimbite*, a tersulphate of iron in its exceedingly rare purplish form ; and a specimen of telluride of gold, W.A. Also rock specimens illustrating crush-conglomerate, a specimen of contact metamorphism, and a specimen of the alteration of *diorite* to *serpentine*. J. G. O. TEPPER, F.L.S., laid on the table a collection of *Lepidoptera* from the Solomon Islands, consisting of 191

specimens, comprising 65 species. They had been presented to the Museum by the Rev. R. T. Mathews, of Port Lincoln.

Ballot.—Prof. T. W. E. David, B.A., of the Sydney University, N.S.W., and John Dennant, F.G.S., of the Education Department, Victoria, were elected Hon. Fellows; and Dr. Morgan and A. M. Lee, Colonial Entomologist, W.A., were elected Fellows.

Papers.—"Descriptions of *Coleoptera*," by Rev. Thomas Blackburn, B.A. "*Opisthobranchs* of the Older Tertiaries of Australia," by M. Cossmann, of Paris, an Hon. Fellow. "Notes on Australian Typhlopidæ," by E. R. Waite, Australian Museum. "Descriptions of *Lepidoptera*," by Oswald Lower, F. Ent. S. "Catalogue of the Native Flora about Port Elliot," by Miss Jessie Hussey. The catalogued names number 355; of these the following 25, including three new species to the province, are additional to the region (*vide* Trans. Roy. Soc. S.A., p. 68, 1889) —*Claytonia corrigiolacea, Casuarina paludosa, Atriplex Muelleri, A. prostratum, Dodonœa Baueri, D. humilis, Pimelea Husseyana* (new species), *Daviesia genistifolia, Pultenea tenuifolia, Helichrysum cinereum, Cassinia punctulata, Logania crassifolia, Styphelia costata, Scutellaria humilis, Pterostylis nutans, P. nana, P. præcox, P. obtusa, Acianthus caudatus, Centrolepis polygna,* and *Danthonia bipartita.*

Ordinary Meeting, May 4, 1897.

Walter Howchin, F.G.S. (President), in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., exhibited a case of Indian *Lepidoptera.* Prof. Tate, F.G.S., laid on the table a fossil species of nautilus obtained near Port Pirie, S.A. W. H. Selway showed an autumnal species of *Pterostylis.*

Ballot.—C. W. Marsh was elected a Fellow.

Paper.—Prof. Tate, F.G.S., read a paper dealing with the conchological collections in the London and Paris Museums.

Ordinary Meeting, June 1, 1897.

Walter Howchin, F.G.S. (President), in the chair.

Exhibits.—W. Howchin, F.G.S., exhibited a large number of glaciated pebbles and rocks illustrative of the glacial features at Inman Valley, S.A.; also photograph of polished surface of Selwyn's Rock, Inman Valley, S.A. Prof. Tate, F.G.S., laid on the table photographs of evidences of glaciation at Crown Gorge and Yellow Cliff, on the River Finke, Central Australia.

Election of Sub-Committee.—After a discussion on the best methods of disseminating information on local predatory insects

and insectivorous birds, it was decided to elect a sub-committee to consider and report on the matter, consisting of W. Howchin, F.G.S. (President), Prof. Tate, F.G.S., Messrs. S Dixon, W. C. Grasby, and J. G. O. Tepper, F.L.S.

Papers.—"Notes on the Glacial Features of Inman Valley, Yankalilla, S.A., and Cape Jervis Districts," by Prof. David, F.G.S., and Walter Howchin, F.G.S. "Evidences of Glacial Action in Central Australia." by Prof. Tate, F.G.S.

Ordinary Meeting, July 6, 1897.

Walter Howchin, F.G.S. (President), in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., laid on the table specimens of all the *Odanati* and genuine *Neuroptera* from South Australia in the Museum. A. Zietz, F.L.S., Assistant-Director S.A. Museum, laid on the table, the nest, egg, and skin of the Queensland rifle bird. The specimens shown belong to *Craspedophora Alberti*, from Cape York. The specimens were collected by Mr. D. LeSouef. Prof. Tate, F.G.S., exhibited the following specimens of mollusca cellected by the Calvert Exploring Expedition: —*Melania onca*, previously only known from the River Adelaide, N.T.; *Vivipara australis*, a widely diffused species in Tropical Australia; and *Unio Sturtii*, a species of Northern and Central Australia. W. Howchin, F.G.S., exhibited rock specimens containing *Radiolaria*, from England, New South Wales, and South Australia (Brighton and Crystal Brook).

Papers.—"Notes on a hitherto undescribed Parrot for S.A.," by A. Zietz, F.L.S, Assist. Director S.A. Museum. "List of Plants collected by the Calvert Exploring Expedition," by Prof. Tate, F.G.S.

Ordinary Meeting, August 3, 1897.

Walter Howchin, F.G.S. (President) in the chair.

Exhibits.—A. Zietz, F.L.S., exhibited native weapons and other articles collected by members of the Calvert Exploring Expedition, from the Fitzroy River and Joanna Springs, W.A. J. G. O. Tepper showed galls from West Australia, consisting of species of *Brachyscelis*; also three specimens of *Cordiceps larvatum*, a fungus growing on caterpillars in New Zealand; also a specimen of the "tsetse fly" (*Glossina marsitans*) from South Africa; also a specimen of the genus *Chelifer* of the *Scorpionidæ* obtained near Mt. Lofty, S.A.

Papers.—"Anthropological Notes," by J. H. Browne, communicated by Dr. Stirling. "On the Occurrence of Lower Cambrian Fossils in the Mt. Lofty, S.A., Range," by W. Howchin, F.G.S.

Ordinary Meeting, September 7, 1897.

Walter Howchin, F.G.S. (President), in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., showed roots of the apple-tree affected with *Schizoneura lanigera*. W. Howchin, F.G.S., exhibited a portion of rock obtained from near Sellick's Hill, S.A., containing Cambrian corals. W. H. Selway laid on the table orchids from between Middleton and Goolwa, which he considered very early. A. Zietz, F.L.S., Assistant-Director of S.A. Museum, exhibited the completely restored fore and hind left feet of *Diprotodon*, and contrasted them with those of such living marsupials as the wombat, kangaroo, native bear, and opossum.

Ballot.—J. H. Browne was elected a Fellow.

Paper.—"On a New *Atriplex* from South Australia," by J. H. Maiden, F.L.S.

Annual Meeting, October 5, 1897.

Walter Howchin, F.G.S. (President), in the chair.

Exhibits. — Botanical and entomological specimens were exhibited by Messrs. Edwin Ashby and J. G. O. Tepper, F.L.S.

Annual Report and Balance-sheet were read and adopted.

Election of Council.—President, W. L. Cleland, M.B.; Vice-Presidents, Prof. Tate, F.G.S., and Walter Howchin, F.G.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretary, G. G. Mayo, C.E.; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., F.R.S., Rev. Thomas Blackburn, B.A., S. Dixon, J. S. Lloyd, and W. H. Selway.

Election of Auditor.—D. J. Adcock was elected Auditor for the ensuing year.

Paper.—"New Genera and Species of Australian Coleoptera," by Rev. Thos. Blackburn, B.A.

Presidential Address.—"On Recent Investigations on the Foraminifera," by Walter Howchin, F.G.S.

ANNUAL REPORT.

The Council has to report that a variety of new matter relating to mollusca, cœlenterata, insecta, marsupialia, anthropology, botany and geology has been brought under the notice of the Fellows and Members during the past year. Amongst the most noteworthy is the discovery of *Radiolaria* and Lower Cambrian fossils in new localities for the Province. The exhibition of the restored fore and hind left feet of *Diprotodon* at the September Meeting is an event which is unique in the history of science; and that it was possible, is largely due to the technical skill of the Assistant Director of the Adelaide Museum, A. H. L. Zietz, F.L.S., who was able to preserve the extremely brittle remains found at Lake Callabonna, South Australia.

During the past year two gentlemen were elected Hon. Fellows on account of the distinguished services which they had rendered to science through the Society. They were Prof. T. W. E. David, B.A., of the Sydney University, and John Dennant, F.G.S., of the Education Department, Victoria. Four new Fellows have been elected, and seven removed by death or otherwise. The Society consists now of 12 Hon. Fellows, 71 Fellows, 13 Corresponding Members, and 1 Associate.

The obituary includes the name of an Hon. Fellow, Baron F. von Muller, whose death has occasioned a loss which it will be difficult to fill, not only to Australian workers, but to the scientific world generally. At the proper time and place this Society will hope to co-operate with Australian learned societies in raising to his memory some fitting memorials. Another Hon. Fellow has also died, namely, Sir W. F. D. Jervois, K.C.M.G., L.B., &c., ex-Governor of South Australia. In the death of Sir Thomas Elder, K.C.M.G., science and art have lost a generous benefactor and this Society a Fellow. Volume XVI. of the Society's Transactions will remain a memorial of the scientific results of one of the expeditions fitted out to explore Central Australia at his expense.

Whilst the principal attention of the Society has naturally been devoted to the receiving and recording of new scientific facts, other matters relating to the economic application of science have not been neglected. A Sub-Committee of the Council was appointed to ascertain the best methods of disseminating information respecting local predatory insects and insectivorous birds. This important matter has received very careful consideration,

and a report may be expected shortly offering some valuable suggestions. In sympathy with this subject may be mentioned the results of the action of the Field Naturalists' Section of the Society through its Native Fauna and Flora Protection Commit tee. Through its energy and instrumentality a Bill is now before Parliament entitled "Protection of Birds Act."

In presenting this report of the year's proceedings the retiring Council fells that although some substantial work has been recorded, yet that much more might have been effected had the Council had ampler means at its disposal. There is an abundance of scientific material awaiting publication, but the Council has had to hesitate about attempting it owing to its straitened means. Happily, owing to the generous action of the Government in subsidising the subscriptions of the Fellows, a little has been accomplished, but this could easily be expanded to three or four times the amount if financial circumstances were propitious. Whilst the Council feels a debt of gratitude to that small branch of Fellows who have year by year so steadily contributed to the funds of the Society, yet it would ask them further to use their influence in persuading others to join the Society and assist in this way the recording of matter pertaining to South Australia of the greatest scientific value.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr. October 1st, 1896.	£	s.	d.	£	s.	d.
To Balance				140	14	8
" Subscriptions—						
Royal Society	64	6	0			
Field Naturalist's Section ...	15	0	0			
Astronomical Section (two years)	16	0	0			
Malacological Section	4	0	0			
				99	6	0
" Donations—						
Dr. Verco	7	10	0			
Dr. Stirling...	12	0	0			
				19	10	0
" Grant from Government				91	1	0
" Interest				1	19	0
				£352	10	8

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing (1½ years)	141	2	6			
Illustrating	65	14	1			
Publishing (1½ years)	12	0	0			
				218	16	7
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery				10	10	0
" Library—Carriage of Books ...				0	10	0
" Grants in Aid—						
Field Naturalists' Section ...	10	0	0			
Astronomical Section	15	0	0			
Malacological Section	3	0	0			
				28	0	0
" Sundries				0	9	10
" Balance in Savings Bank, October 1, 1897				91	4	3
				£352	10	8

Audited and found correct.

D. J. ADCOCK, Auditor.

Oct. 4, 1897.

WALTER RUTT, Hon. Treasurer.

The Anniversary Address by Walter Howchin, F.G.S. (President).

In vacating the Chair, which I have had the honour to occupy for the past two years, I shall be following traditional usage if I make a brief reference to the present position and prospects of the Society. With the current year we publish the twenty-first volume of the Transactions and proceedings of the Royal Society of South Australia. The Society has completed the second decade of its existence, and has a record of work which, if considered with a due regard to its limited membership, and equally limited means, is a matter for congratulation. When we consider the great geographical extent of the colony, and the comparatively recent settlement of its population, it will be understood that the scientific workers have been hitherto mainly engaged in pioneering work, sketching the broader outlines, and gathering the more evident facts in this vast scientific field.

The past year has not been destitute of work done by Fellows of the Society which mark distinct stages in scientific achievements. The first-fruits of Dr. Stirling's and Mr. Zietz's patient elaboration of the Callabonna fossil faunæ has been published in our Transactions in elucidation of the feet and leg-bones of the great struthious birds which have become extinct on Australian soil within comparatively recent geological time. The same authors have had the honor to place a unique exhibit before the Society in a complete osteological restoration of the fore and hind feet of the *Diprotodon*, the first occasion in which these much-debated appendages have been discovered and placed before a scientific society. Dr. J. C. Verco's further descriptions of new species of marine mollusca from his dredgings in South Australian waters, and the Monograph on the Opisthobranchs of the Older Tertiary of Australia by the French specialist and Honorary Fellow of this Society, Maurice Cossmann, are respectively contributions of great value. Within the sphere of new geological observations may be noted the glacial discoveries in the Inman Valley, Yankalilla, and Cape Jervis districts, which have revealed an extinct icefield of vast extent, of which the Hallett's Cove deposits form but a distant outlier. The discovery of a thick group of Lower Cambrian limestones, with characteristic fossils, in the Ranges extending from Normanville to Willunga is of great interest as bearing on the possible age of the Mount Lofty series, it being the only clearly determined datum line in

the older rocks of the hill country to the south of Quorn. The discovery of Radiolaria in the cherty nodules of the Crystal Brook limestones, as well as in the siliceous limestones of Brighton, has opened a new chapter in the palæontology of the older rocks of the colony. At the instant when Professor David and myself thought that in this discovery we had secured organic remains in rocks of Archæan age, the find of Cambrian fossils shortly afterwards in the associated beds has rendered this conclusion exceedingly doubtful.

Our review of the present position of the Society is overshadowed with two regrets. First, that the number of those who either actively or by Fellowship with the Society show practical sympathy with scientific research is so small—a roll of 75 contributing Fellows cannot be regarded as satisfactory in this respect; and second, scientific investigators have reason to be discouraged that the financial resources of our Society—the only Society in the colony devoted to the cause of original research—are inadequate for the effective illustration of scientific discoveries which may have occupied years of patient labor. The scientific investigator takes upon himself honorary and onerous duties, and is content to find his reward in the pleasures of his work and the privilege of adding to the sum of human knowledge. All he asks in return for his voluntary labors is the means of communicating his special knowledge by a suitable channel to others. During recent years original observations of great scientific value have been held back from publication through this lack of monetary means, and unless in the near future the burden is shared by a larger circle in the community, we shall witness the humiliating consequences that discoveries of great national interest will have to go to foreign societies to obtain a voice in the scientific world.

I would now crave your indulgence for a short time whilst reviewing in a brief manner some

RECENT RESEARCHES BEARING ON THE FORAMINIFERA.

Much interest attaches to the occurrence of the Rhizopoda in the older stratified rocks. We may, therefore, in the first place, draw attention to our present knowledge of

The Early Geological History of the Foraminifera.

The lowly organisation of these protean forms of life is suggestive of a remote ancestry that may possibly take us back link by link in an unbroken chain of vitality to the pregnant moment that witnessed the dawn of life on this planet. On evolutional grounds we may plausibly infer that there was a time when the Protozoa formed the characteristic—perhaps the only type of animal life on the earth—a protozoan age that antedated the age of the higher

invertebrates. If such was the case it has left scant evidence of its existence. The practical results of a search in the Archæan and older Palæozoic rocks for these palæontological proofs are extremely disappointing. Instead of finding the limestones of these early periods crowded with the remains of what might be deemed the primitive type of animal life, the Archæan limestones are singularly destitute of organic remains; and when we pass the great interval marked by the unconformability between the Archæans and the Cambrians, we find in the latter a richly differentiated invertebrate fauna with scarcely a trace of the more primitive Rhizopod. It is only when we rise in the geological series as high as the Carboniferous limestone that the Foraminifera become at all a characteristic feature of the deposits, and the maximum of the order was only attained with the Cretaceous and Tertiary formations, or, possibly, in the foraminiferal fauna of the present seas.

It is not improbable that the unclothed amœboid organism was the earlier prevailing type of this class, and that on the gradual increase of carnivorous and predatory forms of life, the *Amœba* obtained a distinct advantage in the struggle for life in the formation of a testaceous covering for its sarcode, either by the secretion of carbonate of lime or by the agglutination of sand grains and other foreign bodies. Such an important modification of habit prepared the way for an endless morphological variation of the organism—gave birth to a new order of Protozoans, and made the Foraminifera the most important member of its class. If the naked condition was the primitive form of the Protozoan type, and the testaceous covering a later and slowly developed modification, this will sufficiently account for the comparative absence of the Foraminifera from the older geological formations.

The discussion on the organic or inorganic nature of Eozöon, which has lasted over 30 years, still continues. A fascination gathers around this so-called "Dawn Animal," "the lone occupant of Laurentian seas," that has called forth laboured investigations and an elaborate literature. Eozöon was first described by Dr. Carpenter and Principal Dawson in 1864. Its organic origin was hotly contested by Professors W. King and T. H. Rowney in numerous publications distributed over a period of 16 years. Their contention was that the so-called organic structure of Eozöon was nothing more than an inorganic arrangement of minerals in a laminar structure that was not uncommon in serpentine rocks, and could be paralleled in the serpentine marble or ophite of Skye, the serpentine of the Lizard, and other examples. Mr. H. J. Carter took up a similar position of scepticism. In 1884 Prof. J. F. Blake examined the typical locality for Eozöon at Côte St. Pierre, in Canada, with the result that he concluded

the nodules of so-called Eozöon were simply concretionary under metamorphic rearrangements, and in a letter to Prof. H. J. Johnston-Lavis, said, "I came away with the clear conviction that we need no longer trouble about its organic nature."*

The latest and most important contribution on this subject is a joint paper read before the Royal Dublin Society by Prof. H. J. Johnston and Dr. J. W. Gregory, and is published in the Transactions of that Society for 1894.† The exhaustive observations which the first-named of these authors has made on the geology of Monte Somma brought to his notice some remarkable lithological features in certain ejectamenta from this old crater, and has supplied the material for the joint paper now referred to, on the "Eozöonal Structure of the Ejected Blocks of Monte Somma.' The blocks in which this structure is seen were derived, according to the authors of the paper, from limestones of Mesozoic age situated at a considerable depth in the funnel of the volcano, and the specimens show an intermediate degree of metamorphism between the comparatively unaltered Tertiary beds in the upper part of the sub-volcanic platform and the more completely fused ultra-basic and basic rocks of greater depth. The genesis of this eozöonal structure can be gathered from the examination of a series of specimens in which it is more or less perfectly developed. As the result of an examination of a large number of these ejected fragments, the authors conclude that "the Eozöon structure has been produced in those limestones which have, under great pressure, in the presence of different gases, and in the neighbourhood of a comparatively basic magma, undergone whole or partial fusion."‡

The remarkable concentric and laminar structure of the eozöonal nodules is accounted for by the interaction of the limestone and the more or less acid magma when brought into contact. Along the line of contact a process of mutual modification takes place. The limestone extracts a proportion of silica from the magma, and the magma is rendered more basic, not only by a loss of silica, but by the absorption of lime and magnesia from the limestones with which it is in contact. The so-called "acervuline layer" in Eozöon is accounted for by this process of interchange and chemical reaction, attenuated and irregular silicate bands being produced by the exhaustion of the silicic substances in penetrating into the limestone. The presence of *tubuli* in Eozöon structure is the strong point of evidence with

* "Eozöonal Structure of Ejected Blocks of Monte Somma," by Prof. H. J. Johnston-Lavis and J. W. Gregory, D.Sc., Sc. Trans. Roy. Dublin Soc., Vol. V. (Ser. 2), 1894, p. 274.

† Op. cit.

‡ Op. cit., p. 264.

those who assert the organic origin of the specimens, and supplies the characteristic feature that has led to its classification with the Nummulinidæ. Similar tubuli or stoloniferous passages, filled with mineral matter, are seen in the Monte Somma specimens passing through the calcareous layers, and communicating with the intermediate bands. These tubuli are supposed by the authors to mark the main passages along which the fluid or gases penetrated.

The photographic figures given in illustration of the work are extremely suggestive of the anomalous Laurentian fossil, although, judging from the plates, the cell walls and canal system lack the definiteness and clear outline of the type specimens. Sir J. W. Dawson has given a short rejoinder to Professors Johnston-Lavis and Gregory, in *Nat. Science* of June, 1895, in which article he says—"I must emphatically deny that they resemble either in composition, mode of occurrence, or form and structure the Laurentian Eozöon of Canada." Nothwithstanding this rejoinder the latest evidences tend to weaken the proofs of the organic origin of this doubtful object rather than confirm the conclusions which in the early years of its discussion were generally accepted. One result of this prolonged discussion has been to illustrate in how many instances petrological structure may simulate organic features, and emphasizes the caution that should be exercised in referring doubtful structures, especially when included in altered and metamorphic rocks, to organic agencies.

The discovery of Foraminifera in the Cambrian rocks of southern New Brunswick by Messrs. W. D. and G. F. Matthew is of considerable interest. So far as I am aware, this is the first case in which Foraminifera have been noted in rocks of Cambrian age. They were discovered in the first instance by sectioning the phosphatic nodules contained in the St. John series near the base of the Lower Cambrians, and are associated with a group of fossils of a distinctive character, which Mr. G. F. Matthew has described in the Transactions of the New York Academy of Science, vol. XIV. (1894-95), as "The Protolenus Fauna." The Foraminifera are referred to the genera *Orbulina* and *Globigerina*, two of the commonest genera of the present seas, and whilst seven new species are described, the remaining one, *Orbulina universa*, is said to be indistinguishable from the same species which makes up so large a proportion of the Atlantic ooze of to-day. Without calling in question Mr. Matthew's determination, it is well to remember that extreme caution is demanded in the determination of fossils of so great a geological age, and particularly those (as in the case of the genera referred to) which have a spherical form, as this is more easily simulated by inorganic structure than any other outline. The previous records for the geological distribu-

tion of *Globigerina* do not go further back than the Jurassic, and those of *Orbulina*, not earlier than the Lias. In view of the present discovery, it is remarkable that no trace of either genus has been found in the comparatively rich foraminiferal fauna of the Carboniferous Limestone. Assuming the determination of the author to be correct, it places *Orbulina universa* in a unique position as the oldest surviving species among living things; and if the claims of Eozöon be disallowed, the Protolenus horizon of St. John has the earliest record for the occurrence of Foraminifera in any part of the world.*

If I may be allowed a moment's digression from the immediate subject of my address, I would draw attention to the fact that it seems probable that more success will attend the search for the Radiolarian representatives of the Rhizopoda in the older stratified rocks than remains the Foraminifera. L. Cayeux has recently announced the discovery of Radiolaria in the Pre-Cambrian rocks of Brittany. Whilst there are some aspects of this supposed discovery that have led other specialists to regard Cayeux's determinations with some scepticism, it will quicken the interest in these old and so-called azoic rocks that will no doubt shortly place the matter beyond question. During the last three years simultaneous discoveries of Radiolaria have been made in many countries and from most formations, ranging from the Cambrian to the present day. These results have been in many cases, particularly those pertaining to the older rocks, obtained from the examination of the much neglected cherty bands and nodules which frequently accompany calcareous beds of all ages.

BIOLOGICAL INVESTIGATIONS.

From the days of Conrad Gesner in the middle of the sixteenth century the delicate and varied forms of the Foraminifera have commanded an increasing attention from scientific workers, yet it is only within the last few years that any definite knowledge has been obtained of the life history of this interesting Order. The opacity of the investment has made the investigation of the soft parts of the animal, in most cases, practically impossible and, even where the shell exhibited some translucency, as soon as the animal was removed from its normal conditions for observation it withdrew its body to the central portions of the shell, whilst the vital functions either ceased or were for the time being suspended. Two improved methods of enquiry have led up to the present advance in our knowledge of the biology of the Foraminifera. The first of these is an improved method of sectioning the shell introduced by Mons. C. Schlumberger, of Paris, by means of

* Unless we accept the statement of L. Cayeux that he has obtained Foraminifera, as well as Radiolaria, from the Pre-Cambrians of Brittany.

which the excessively delicate central chambers of the test are preserved from destruction in the mechanical process; the second, an ingenious contrivance of Mons. F. Schaudinn, assistant at the Zoological Institute of Berlin, by which Foraminifera can be placed under observation throughout all the phases of their existence.

As far back as 1841, Ehrenberg noticed a *Spirillina* with a great number of young examples within the chambers of the parent shell, and as the observation was unique he conferred upon it the trivial name of *vivipara*. Similar phenomena were subsequently seen by Schultz and other observers in individuals belonging to several different genera. In 1861 Mr. Carter detected the existence of spherules in the chambers of some fossil Foraminifera, which he regarded as "propagative agents." * About the same time attention became directed to the structure of the sarcode or protoplasm that formed the living body of the animal, and in 1878 A. Schneider published † the results of his researches with regard to the reproductive processes pertaining to the genus *Miliolina*. The most striking point of Schneider's researches was, that in some instances the protoplasmic body became broken up into two kinds of minute bodies, the smaller of these, possessing spontaneous movement, he regarded in the light of spermatozoa, and the larger as ova. The latter developed into young *Miliolina*, and after secreting a delicate calcareous test passed into a free condition. These observations of Schneider require confirmation. The first definite step in elucidating the life history of the Foraminifera was taken, however, in 1880, when Munier-Chalmas, the distinguished French microscopist, announced that in the case of certain species of *Nummulites* and *Assilina* the initial chambers were formed on two distinct plans. In the one case the primordial chamber was large, and in the other the same primordial space was occupied by a number of small chambers. Thus the individuals of a species were divided into two natural groups (1) those which had a megalospheric central chamber, and (2) those with a microspheric centre. The external features of the two groups were identical, except that those individuals which had the large central chambers were, in most species, smaller in size than those which had the smaller but more numerous central chambers. This "dimorphism," as it was called by Munier-Chalmas, has been made the subject of careful and systematic investigation by the last-named eminent savant in conjuction with the able and energetic specialist, Charles

* Ann. Mag., Nat. His. Ser. 3, Vol. VIII., 1861, p. 309.

† Beiträge zur Kenntniss der Protozoen. Zeits. f. Wiss., Zool., Vol. 30, Sup. 1878, p. 446.

Schlumberger, and by their united efforts the existence of a dimorphic origin has been demonstrated in the case of over twenty genera.

The question that immediately arose, and awaited solution, was, "What is the meaning of this dimorphism?" That it had a distinct relationship to the process of reproduction was generally inferred, and its significance in this respect has given rise to much discussion. The first point that required determination was whether the dimorphic features were aboriginal in the history of the individual, or caused subsequently to birth by a secondary growth of smaller chambers within the macrospheric chamber, an alternative that was soon decided in favour of the view that the difference was aboriginal.

In 1894 Mr. J. J. Lister, in a paper read before the Royal Society of London on "The Life History of the Foraminifera," gave a full and lucid resumé of the state of knowledge on this subject to date, with many valuable, original observations. Lister's researches have been directed chiefly to the study of the nuclei of Foraminifera in relation to reproduction. His observations were confined to a limited number of forms, and chiefly the cosmopolitan species, *Polystomella crispa*. This careful observer was able to note that the nuclei of the megalospheric and microspheric individuals of a species differed essentially from each other. The megalospheric form carries but one large nucleus during the greater part of the life of the individual, whilst the microspheric form, in the place of a large central nucleus, contains several small nuclei. This discovery of a physiological, as well as a morphological difference, in the two forms strengthened the assumption that they owed their difference of form to aboriginal causes.

The next point was to establish what relationship the two forms bore to each other in the life history of the species. Did the difference of form mark a difference of sex? Or did the two forms represent a cycle of recurring generations, as may be seen in some other departments of Natural History? Lister was led to discard the sexual hypothesis chiefly from the study of *Orbitolites complanata*, in which he found the young of the megalospheric form in the brood chambers of both megalospheric and microspheric individuals; "hence," he says, "it is impossible to regard either form as male." In a postscript to his paper, of slightly later date, he reaches a definite conclusion on this point in the following words, "The fact that the whole of the protoplasm of the parent is used in the production of the young, and that these are all of one form, supports the view that the two forms of the Foraminifera belong to different generations."*

* Op. cit., p. 446.

We must now refer to the brilliant work done by Schaudinn in the elucidation of this interesting biological problem, who quite independently of Lister has been engaged on the same investigations, and by a curious coincidence has taken the same species as Lister (*Polystomella crispa*) as his principal type. Not only have these two eminent naturalists been independently led to the same conclusion, but Schaudinn has thrown much additional light on the reproductive phenomena of the Foraminifera.* By the use of very high magnifying powers (up to 2,000 diameters) he has watched the changes that take place in the nuclei during the reproductive process, and are of the greatest interest. In the first place he has never seen a nucleus multiply by *constriction*, as is frequently the case in some Orders of the Protozoa, but the nucleus passes through a succession of very remarkable and complex changes which cannot well be made intelligible without reference to the diagrammatic figures by which his work is illustrated. Stated generally, however, the nucleus when passing into the reproductive stage first develops a granular centre, around which gathers a sphere of droplets like an alveolary border. A process of segregation goes on and a cyst is formed, the inner surface of which is covered by a number of compact spheroidal bodies. When matured, the cyst bursts and the spheroids are distributed throughout the protoplasm of the animal as embryonic nucleoids.

The next question was to determine the distinctive changes which take place respectively in the megalospheric and microspheric forms of propagation. In the case of microspheric generation there develops the cyst-like bodies with included zoospores, as already described. In the crisis of reproduction, the cyst bursts, the corpuscular bodies are set free, and by a rapid circulatory movement, that is set up concurrently in the protoplasm, they are evenly distributed throughout the mass. At this stage the whole of the protoplasm vacates the shell, forming an irregular mass. The protoplasm then divides into sections of various sizes, each fragment assumes a rounded form, secretes a calcareous test, and this globular test constitutes the primordial chamber of a *Polystomella crispa*, of the megalospheric form. In these observations two points were established; first, that the whole of the parent body was used up in the formation of offspring; and, secondly, a microspheric individual gave birth to a megalospheric progeny.

* For particulars of M. Schaudinn's investigations I am chiefly indebted to M. Schlumberger, who in the following two papers has given an excellent resumé of Schaudinn's Preliminary Notes, with a reproduction of Schaudinn's figures. *Note sur la Biologie des Foraminifères. La Plastogamie dans les Foraminifères*, par Ch. Schlumberger, in *La Feuille des Jeunes Naturalistes*, in Mars et Mai, 1896.

It now became the task of the investigators to watch the evolution of the megalospheric form. A considerable proportion of the nucleoid bodies that during the embryonic condition were scattered through the protoplasm of the microspherical individual were seen to unite and form a compact mass, which became the nucleus of a new megalospheric individual, and, according to Lister, such nucleus generally occupies the primordial chamber. When this individual of the megalospherical plan of growth has reached the reproductive stage, the principal nucleus disappears, broken up and absorbed into the protoplasmic mass, and minute nuclei make their appearance. A karyokinetic division of all the nuclei follows, the latter acting as centres around which the protoplasm arranges itself, forming small spherical masses which gradually and uniformly become distributed throughout the protoplasmic body until the whole of the body substance is used up in their formation, and the minute spheroids, which are the ultimate product of this extended process of division, are set free as flagellated zoospores of uniform size. These zoospores form the embryos of the microspheric form of *Polystomella crispa.*

In these results the biological significance of the megalospheric and microspheric plans of growth among the Foraminifera has been explained. It has been demonstrated there are two methods of reproduction—one by the production of embryos, and the other by the emission of spores. The microspherical group produce young in the form of embryos, which develop into megalospheric individuals; and the megalospherical group produce spores, which in turn reproduce the species on the microspherical plan of growth. In a few rare cases, however (Schaudinn noticed three in 4,300), it has been observed that where no principal nucleus was formed in a megalospherical individual, the small nucleoid bodies multiply directly from themselves, forming embryos instead of spores. In this case a megalospherical parent produces megalospheric offspring without an intermediate microspheric generation. The proportion of numbers in the two forms is worthy of note. The megalospheric form is much more common than the microspheric. The proportion in *Polystomella crispa*, according to Lister, is in the ratio of 34 to 1; and in *Adelosina polygonia*, according to Schlumberger, the relative proportions are as 8 to 1. The season of the year has apparently something to do with these relative numbers, for the microspheric, or spore-produced forms, on Lister's observations, occur in greater numbers in the height of summer than in other parts of the year.

If I may for a moment longer tax your patience in reviewing these biological researches I would refer to a recent discovery in which M. Schaudinn has still further advanced our knowledge of the life history of the Foraminifera. He has obtained abundant

evidence of the occurrence of copulation in some species which he has had under observation. His preliminary notes * on this subject have, by the consent of the author, been summarized and translated into French by M. Schlumberger in a paper published in *La Feuille des Jeunes Naturalistes*, in May, 1896, to which I am indebted for a knowledge of this part of M. Schaudinn's discoveries.

Prior to the discovery now referred to, copulation had been observed to take place among some of the Rhizopoda, but no exact determination had been made of the changes that were thereby induced in the individuals concerned in the act; and, prior to the observations made by Schaudinn, no one had noted the occurrence of copulation among the Foraminifera. The researches of Maupas and Hartog on the methods of reproduction among the lower forms of life, both in the vegetable and animal kingdoms, published about five years ago, undoubtedly prepared the way for the recent discoveries among the Foraminifera. Maupas had pointed out that in the lower organisms long-continued propagation by fission without fusion resulted in a state of senescene and ultimate extinction. This has been abundantly confirmed by Professor Hartog, who says:—"We have evidence on all sides to show that a sexual reproduction, colonial or cellular, is rarely continued indefinitely in those organisms which have a sexual process. After a certain continuance of asexual reproduction the strain deteriorates." † What the author calls a "rejuvenescence" must be attained by fusion of individuals to prevent degeneration, and maintain the vigour of the organism. To reach this rejuvenescence, in the case of the Protozoa, Hartog notes that there are two leading types of reproduction, which he designates respectively Karyogamy and Plastogamy. Karyogamy (a term first used by Maupas) is defined by Hartog to be "the fusion of two or more nuclei as well as of the cytoplasts into a uninucleate cell." ‡ "Plastogamy is the cytoplastic union of cells without nuclear fusion. This, of course, brings about complete mixture of the cytoplasts, comparable to that of the nuclei in Karyogamy." § In the discoveries of Schaudinn, to be immediately referred to, it will be seen that copulation among the Foraminifera is plastogamic rather than karyogamic.

For the purposes in view, Schaudinn has chiefly confined his observations to two species of Foraminifera, *Patellina corrugata* and *Discorbina globularis*, both of which are common forms in

* F. Schaudinn, *Ueber Plastogamie bei Foram.; Sitz. Bericht. d. Gesellsch. Naturforsch. Freunde*, 1895, No. 10.

† "Some Problems of Reproduction," by M. M. Hartog, Quar. Jour. Micro. Soc., vol. XXXIII. (1892), p. 64.

‡ Ibid. § Ibid.

Australian waters. One point clearly demonstrated is that copulation can only take place under conditions in which the respective individuals are qualified for copulation. These conditions are apparently determined by the state of the nucleus. Copulation only ensues when the individuals concerned have but a single nucleus and this nucleus at rest, that is to say, not undergoing sub-division. In every case observed where one or both of the individuals of the same species had their nuclei on the way to divide, the pseudopodia instead of fusing shrank away from each other, but when two individuals approached each other having their nuclei in the embryonic chamber, in a quiescent condition, copulation ensued. These results were observed, not only in the case of such examples as happened to come into contact fortuitously, but were repeatedly experimentally confirmed by Schaudinn, who used artificial means in bringing individuals together in various states with regard to their nuclear condition.

The act of copulation in the case of *Patellina* consists apparently in the fusion of the protoplasm—that is, the *cytoplast* as distinct from the *nucleus* in the individuals concerned. First the pseudopodial extensions touch and merge and ultimately the main portions blend, by which means the respective tests are raised until they touch, not face to face, but at an angle forming a V shaped space between the two shells. The open sides are rapidly built up by the organisms with grains of sand and other fortuitous fragments that may be at hand, to give the greater protection, and (as we have already seen taken place in the case of *Polystomella crispa* when in the act of reproduction) the whole of the animal substance leaves the shells and is united into one mass enclosed within the chamber formed for the occasion. After the lapse of an hour or two, or even days, the protoplasmic mass breaks up and concentrates around the nuclei; each little fragment takes a globular form and secretes a test which forms the embryological chamber of the new life. When the embryos are ready for independent existence the temporary barriers are broken and they escape from the "nuptial cavern." In this act of copulation several individuals can take part concurrently (Schaudinn actually observed groups up to five) but they must all be mononucleary in condition, and the fusion is limited to the protoplasm as distinct from the nuclei.

The process of copulation in *Discorbina* is very similar to that already described in the case of *Patellina*. The flat faces of the tests are brought together so that the respective apertures can readily communicate. Portions of the walls of the final chambers are even reabsorbed to permit of freer intercourse, and the open space between the shells temporally enclosed by a film of carbonate of lime. The multiplication of the nuclei and the formation of

embryos go on simultaneously in the two individuals. Each nucleus forms an embryo—only one nucleus to each embryo—and the latter develops two or three chambers by growth before it escapes from the conjugal enclosure.

It is therefore clear that, whilst an agamic reproduction is the commonest method of increase among the Foraminifera, a conjugal union of individuals is necessary at certain times and under fit conditions as a means of preventing the deterioration of the species. It has also been established, so far as the species placed under observation are concerned, that the act of copulation is exclusively of the nature of plastogamy.

Quite recently Mr. J. J. Lister has propounded a very ingenious theory to explain the alteration of plan of growth which takes place in the microspheric forms of *Biloculina* and *Triloculina*.* Among the Miliolidæ the principal types exhibit a biloculine, triloculine, or quinqueloculine test, according as two, three, or five chambers are exposed externally. It has been observed that in the case of the (? sexually produced) microspheric forms of *Triloculina* the early chambers of the shell are arranged on a quinqueloculine plan, changing in the later stages to the triloculine arrangement; and in the case of *Biloculina*, the early chambers are quinqueloculine, then triloculine, and finally biloculine. No such transmutations of form occur in the (asexual) megalospheric forms, but these are respectively either triloculine or biloculine throughout their growth. The questions Mr. Lister has attempted to solve are—First, why this remarkable change should take place in the growth of the genera referred to; and, second, why such a change should be characteristic of the microspheric and not the megalospheric form. The assumption is, that the sexually-produced microspheric form goes out of its way to repeat the arrangement characteristic of allied forms before it attains the arrangement proper to its own genus. Mr. Lister says—"Is not this a particular instance of a phenomenon widely met with in higher forms of animals, in which the individuals produced by budding attain the adult structure by a direct development, while those produced from the egg often develop by an indirect course, going out of their way to repeat lost features characteristic of the archaic forms of their race? . . In the case of higher animals the larval stages are lost, the body of the larva being fashioned into that of the adult, but in this group of the Protozoa, the Miliolidæ, the peculiar structure of the young is permanently recorded, being built in and retained in the centre of the chambers subsequently added."† If Mr. Lister's

* "A Possible Explanation of the Quinqueloculine arrangement of the Chambers in the Young of the Microspheric Forms of *Triloculina* and *Biloculina*," Proc. Cambridge Phil. Soc., vol. IX., p. 236 (1897).

† Op. cit.

interpretation of these structural phenomena be correct, it follows that the quinqueloculine plan of growth is the primitive type of the group, whilst the triloculine and biloculine varieties represent later modifications of the primitive form in its successive stages of evolution.

FORAMINIFERA IN BOULDER CLAY.

What promises to have an important bearing on the theory of the formation of Boulder Clay in the Northern Hemisphere is the discovery of Foraminifera in the glacial deposits of Ireland, Scotland, England, Denmark and other Continental countries. As far back as 1879, Mr. Joseph Wright, of Belfast, began an examination of the Boulder Clay for Foraminifera, and has summarised his latest results in two papers published in the Transactions of the Geological Society of Glasgow for 1894 and 1895. In almost every instance in which he examined the unstratified Till of Ireland and Scotland, he found Foraminifera present in the material. The shells, which in the majority of cases were rare, were found free from either weathering or abrasion, and had evidently lived and died *in situ*. It would have been of great interest if Mr. Wright had indicated at what height above the sea the samples were taken from, and whether the Boulder Clay of high altitudes carried the same evidences of foraminiferal life as the Clay at lower levels. The attention of other investigators having been called to these occurrences, Mr. T. Mellard Reade * has been successful in finding Foraminifera in the Boulder Clay of England. Dr. Madsen † has made a similar discovery in Denmark, and Johannes Korn ‡ in Germany. The unstratified Till has been hitherto generally considered as a *moraine profunde*, but if the evidences now adduced be confirmed as a feature pertaining to the Till in general, it will prove beyond question that it has been laid down under marine conditions.

THE DETERMINATION OF LOCAL FAUNÆ.

The recent work done among the Foraminifera in determination of local faunæ commands a moments notice. In the lamented death of my friend and frequent helper (Henry B. Brady, F.R.S.) in 1891, the most conspicuous British authority on the Foraminifera was removed from us. His death left a gap in the British ranks that has not been adequately filled by any one particular worker in this department of natural history, but there are not a few whose labors are worthy of honorable mention. The monograph on "The Foraminifera of the Crag," which was begun

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* Proc. Liverpool Geo. Soc., 1896.

† Middelelser Fra Dansk. Geologisk Forening, 1895.

‡ Ueber Foraminiferen in Glacialthonen. Neus Jahrbuch für Mineral, Geol. und Paläontol. Stuttgart, 1895.

by the publication of Part I. in the Palæontographical Society's volume for 1865, has, after an interval of thirty years, been completed in the Society's volume for 1895. The authorship of the earlier part was by Messrs. Rupert Jones, W. K. Parker, and H. B. Brady. Of this distinguished triad only the first-named remains with us to-day. Prof. Rupert Jones, whose name will ever stand in the first rank of students of the Foraminifera, and who has nearly completed his half century of observations in this department of study, takes the leading position in the completion of the monograph. He has been ably assisted by H. W. Burrows, C. D. Sherborn, F. W. Millett, R. Holland, and F. Chapman, each of whom brings a special knowledge to bear on the branch of the work entrusted to him. It is significant of the progress the science has made in the interval that no less than thirty-one of the specific determinations made in Part I. have had to be corrected in their classification in the Part just published. Mr. Frederick Chapman, F.R.M.S., who either independently or as collaborator with other well known naturalists, has greatly enriched our knowledge of the British fossil Foraminifera, has for more than ten years been engaged on a monograph of the Foraminifera of the Gault, of which nine Parts have already been published and about 250 species figured. Mr. Chapman's patient and exhaustive labors are all the more valuable in that he has worked out the foraminiferal fauna of the Gault in relation to the zonal distribution of the species.

Deep sea dredging for scientific purposes has, of late years, been prosecuted by many of the leading nations of the world. An expedition of this kind was carried out by the U.S. Fish Commission steamer "Albatross" in 1891, under the scientific control of Alexander Agassiz, the able Director of the Museum of Comparative Zoology at Harvard College. The ground investigated was an unexplored region of the ocean floor off the West coast of Central America, from the Galapagos on the Equator to the Gulf of California as the northern limits of the explorations, and has yielded material for a large number of monographs in elucidation of the rich and interesting faunæ then obtained. The Foraminifera were intrusted to Axel Goës, the eminent Swedish naturalist, who has worked out with distinguished ability the very rich foraminiferal material obtained in these dredgings, and has added to our knowledge a large number of new forms. Goës' Work forms the XX Bulletin of the series, and was published in 1896.

One of the most valuable contributions to our subject within recent years is that of Dr. R. D. M. Verbeek and R. Fennema in a joint description of the Geology of Java and Madoura*,

* Description geologique de Java et Madoura. Tomes II. Amsterdam, 1896.

published last year in two volumes by order of the Governor-General of the Netherlands East India. The islands of Java, Sumatra, and others that are adjacent, possess a remarkable assemblage of large Foraminifera, chiefly of Tertiary age, belonging to several genera. The authors referred to have confined their attention mainly to these conspicuous forms, and particularly those belonging to the Family Nummulinidæ, which they have described with great care and illustrated by detailed drawings that are models in their clear and faithful representation of the objects described. The Work must rank as one of the most important contributions in the elucidation of this important family of the Foraminifera.

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Before I conclude, I must refer to one more important contribution to the study of the Foraminifera, which, though not dealing with research in the ordinary use of that term, has placed all original workers under lasting obligations to its author. I refer to Mr. Charles Davies Sherborn's exhaustive work, "An Index to the Genera and Species of the Foraminifera," published by the Smithsonian Institution, in two parts; Part I. being issued in 1893, and Part II. in 1896. Mr. Sherborn had already secured a world-wide reputation by his "Bibliography of the Foraminifera," brought down to the year 1888, and his "Index" supplies a ready reference to all species that have been described up to 1889. The work is an inestimable boon to the specialist, not only minimising the labour of wading through a voluminous and scattered literature, but has greatly limited the chances of duplication in the description and naming of species. In the same direction I cannot forbear mentioning the valuable aid which naturalists, in general, will in future obtain from the "Record of Geological Literature," which the Geological Society of London has recently undertaken to publish as an annual volume. The scheme followed will practically amount to a Bibliography, in at least the geological field of investigation, and be the means of calling attention to the published results of of workers in the same departments of study that might otherwise be overlooked.

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1887. Grasby, W. C., F.L.S., Grenfell-street, Adelaide, South Australia.
1896. Greenway, Thomas J., East Adelaide.
1896. Hawker, E. W., LL.B., B.A., F.G.S., Gladstone Chambers, Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, South Australia.
1883. *Howchin, Walter, F.G.S., Goodwood East, South Australia.
1893. James, Thomas, M.R.C.S., England, Moonta, South Australia.
1896. Jones, J. W., Conservator of Water, Adelaide.
1853. (F) Kay, Robert, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide, South Australia.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1897. Lea, A. M., Col. Entomologist, Perth, W.A.
1884. Lendon, A. A., M.D., M.R.C.S., Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.
1856. Lloyd, J. S., Adelaide, South Australia.
1888. *Lower, O. B., F. Ent. S., Broken Hill, N.S.W.
1885. *Lucas, R. B., Adelaide, South Australia.
1896. Lukowitz, M. von, M.D., Adelaide.
1897. Marsh, C. W., Menzies, W.A.
1874. Mayo, G. G., C.E., Adelaide, South Australia.

1892. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, South Australia.
1859. (L) Murray, David, Adelaide, South Australia.
1884. Munton, H. S., Brighton, South Australia.
1896. Parker, Thomas, C.E., F.G.S., Rockhampton, Queensland.
1893. Perks, R. H., M.D., F.R.C.S., Adelaide, South Australia.
1883. Phillips, W. H., Adelaide, South Australia.
1886. Poole, W. B., Adelaide, South Australia.
1892. Priestley, P. H., Unley Road, Parkside.
1895. Ramage, Rev. Granville, Norwood, South Australia.
1885. *Rennie. H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1876. Rutt, Walter, C.E., Assistant Engineer-in-Chief, Adelaide, South Australia.
1891. Selway, W. H., Jun., Adelaide, South Australia.
1893. Simson, Augustus, Hobart, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, South Australia.
1871. Smith, Robert Barr, Adelaide, South Australia.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Director South Australian Museum, Adelaide, South Australia.
1893. *Streich, Victor, F.G.S., Windanya, W.A.
1876. *Tate, Ralph, F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J.G.O., F.L.S., Entomologist South Australian Museum (Corresponding Member, 1878), Adelaide, South Australia.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Joseph, J.P., Adelaide, South Australia.
1878. *Verco, Joseph C., M.D, F.R,C.S., Lecturer on Therapeutics University of Adelaide, Adelaide, South Australia.
1883. Wainwright, E. H., B.Sc., St. Peter's College, South Australia.
1878. Ware, W. L., Adelaide, South Australia.
1859. Way, Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner, Adelaide, South Australia.
1886. *Zietz, A. H. C., F.L.S., Assistant Director South Australian Museum, South Australia.

ASSOCIATE.

95. Cleland, John B., Parkside, South Australia.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

FOURTEENTH ANNUAL REPORT OF THE COMMITTEE,

BEING FOR THE YEAR ENDING SEPTEMBER 30, 1897.

Evening Meetings.—Eight evening meetings have been held, at which papers have been given as under:—

1896.

Oct. 20—Mr. O. E. Menzel, "Botanical Excursions in N.S. Wales."

Nov. 17—Various members, Results of Excursion to Port Elliot, Port Victor, &c.

1897.

Apl. 13—Mr. J. Aitken, "The Fauna of Boston Island, Port Lincoln."

May 18—Mr. J. W. Mellor, "Notes of a Collecting Trip to the Flinders Ranges."

June 15—Miss J. L. Hussey, "A Few Notes on South Australian Algæ."

July 20—Mr. E. Ashby, "Marine Life on the Brighton Rocks."

Aug. 17—Mr. W. Howchin, F.G.S., "The Glacial Age in South Australia."

Sept. 31—Annual meeting, Chairman's Address by Mr. M. Symonds Clark.

The aggregate attendance at these meetings has been greater than for several years past. It will be seen that the subjects dealt with have embraced several departments in Natural History, the greatest interest, judging by the attendance, being shown in Mr. Howchin's address on the "Glacial Age in South Australia." Most of the papers have been given by, scientifically speaking, the younger members of the Section, which must be regarded as a hopeful sign. The exhibits have again been numerous and interesting, and have given practical evidence of the enthusiasm of collectors, especially in the departments of botany, ornithology,

and conchology. At the September meeting the orchid *Acianthus caudatus*, found by Miss Hussey near Port Elliot, was exhibited for the first time in the Section's history.

Excursions.—During the year eleven excursions have been held, of which the following is a list :—

1896.

Oct. 10—Norton's Summit.
" 24—National Park.
Nov. 7–9—Three days' excursion to Port Elliot, Port Victor, &c.

1897.

Feby. 20—Trawling and dredging off Glenelg.
April 10—Dredging in Port River.
May 15—The Grange (Pine Forest).
June 12—Henley Beach to Glenelg.
July 17—Black Hill.
Aug. 21—Semaphore to Grange.
Sept. 1—Golden Grove and Gorge of the Little Para River.
" 18—Blackwood.

The most noteworthy excursion was the three days' visit to Port Elliot, &c., in November last, when about twenty members enjoyed a pleasant and profitable holiday. Several plants new to most of the party were then gathered by them for the first time. In the winter months the coast was visited, chiefly for securing shells, while in the summer there were two trips on the sea, one off Glenelg, for trawling and dredging; the other in the Port River, for dredging only. One excursion was held chiefly for the study of ornithology. The whole-day trip on September 1st to Golden Grove and the Gorge of the Little Para River (which places had not been visited together for 13 years) was successful both from a social and scientific point of view, and additional pleasure was given to the occasion through the kind hospitality of Mrs. Robertson, of Golden Grove. The remaining excursions were made to the hills, including that favourite resort —National Park.

Protection of our Native Fauna and Flora.—A separate report is, as usual, presented by this Committee, which, it will be seen, has been engaged in formulating a new Bill to afford better protection to our native birds and other animals.

Royal Society's Library.—The members of the Section were reminded during the year that they had the privilege of access to the valuable collection of books in the Royal Society's Library.

Rules.—Owing to the necessity of a reprint of the Section's Rules, the Committee have gone through them seriatim, and have suggested a few alterations which they think will be an improvement.

Financial.—The subscriptions have again considerably exceeded the payments, the former having amounted to £15, while the disbursements have only been slightly over £10.

Membership.—Fresh names continue to be added to our roll of membership, whilst, as always happens, some have been removed from various reasons. The number now on the roll is 88.

M. Symonds Clark, Chairman.
W. H. Selway, Jun., Hon. Secretary.

Adelaide, 20th September, 1897.

NINTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA, TO BE PRESENTED AT THE ANNUAL MEETING OF THE SECTION ON 21st SEPTEMBER, 1897.

The Birds Protection Act.—The chief business of your Committee has been the preparation of a bill for the further protection of the native fauna, embodying most of the provisions (in an amended form) of the Game Act and the Kangaroo Protection Act, together with some new clauses. Your Committee, believing that the term "Game Act" was misleading, adopted the name of the "Birds' Protection Act." The new clauses comprise provisions, amongst others, for the protection of Cape Barren geese on their island breeding places; for the establishment of public and private reserves for the protection of birds and other animals: for preventing the sale of kangaroo skins of less than 1 lb. in weight; for the issue of licences to trap alive birds, &c., for the purpose of domestication; and for the granting of permits to scientific collectors, providing, however, that such licences and permits shall become void on conviction of the holder of any offence under the Act. The first schedule comprises birds and lizards to be protected during the whole year, the native birds being distinguished by the scientific family or generic names taken from Gould's Handbook to the Birds of Australia. The second schedule includes all other birds and quadrupeds, with certain named exceptions, to be protected during portions of the year. Mr. Wm. White generously offered to submit the draft bill to his solicitor, who suggested several amendments of a verbal nature, which greatly improved the measure. The Minister of Education has kindly promised to take charge of the bill. It is

now in print, and your Committee hope it may be introduced this session.

The Mount Lofty Recreation Reserve.—In response to a communication from the Secretary, a letter was received from Mr. L. J. Milford, Honorary Secretary to the Committee taking charge of this Reserve, stating that his Committee would do all in their power to prevent the destruction of shrubs and birds upon the Reserve.

Kangaroo District, No. 2.—The period proclaimed for the protection of kangaroos in the western portion of the colony having expired, the Secretary wrote to the Commissioner of Crown Lands suggesting an extension of the period for another term, and on the 14th inst. he received an intimation that this request had been complied with. A notice in the *Gazette* of the 9th inst. proclaims an extension for two years from the 8th inst. as regards this district, comprising the Crown Lands in counties Robinson, Dufferin, Way, Kintore, and Hopetoun.

Your Committee having last week observed a report of a seizure in Victoria of a number of ducks, teal, &c., amounting to some 3,000 head, which had been destroyed in the close season, the Secretary wrote to the Commissioner of Crown Lands and Survey, Melbourne, congratulating him on the seizure, and expressing the hope that adequate penalties had been imposed upon the perpetrators of such wholesale destruction.

Your Committee, in conclusion, desire to express their thanks to the Commissioner of Crown Lands, the Minister of Education, and the Commissioner of Police for assistance given in carrying out their aims.

SAMUEL DIXON, Chairman.
M. SYMONDS CLARK, Hon. Secretary.

Adelaide, 20th September, 1897.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1896-7.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.
To Balance brought forward	3	10	2	By Postages and Sundries	4	9	8
" Grant from Royal Society	10	0	0	" Printing	5	1	0
" Subscriptions	15	0	0	" Attendance	1	0	0
					10	10	8
				" Subscriptions as per contra paid over to Royal Society	15	0	0
				" Balance in hand	2	19	6
	£28	10	2		£28	10	2

Audited and found correct.

THOS. EVANS, F.S.A.I.A., } Auditors.
THOS. FABIAN, }

Adelaide, 20th September, 1897.

W. H. Selway, Jun.,
Hon. Secretary and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

FIFTH ANNUAL REPORT.

The Committee congratulate their fellow-members on being able to present a Fifth Annual Report for their adoption.

The number on the roll is the same as last year, two having been lost and two gained.

The work of the Society has been carried on by the President and a few active members, which circle the Committee think should be widened, and with that end in view has had prepared a list of subjects, from which every member might select one or more on which he could express his opinion or seek for information, thereby starting a discussion, and so increase the interest of the general meetings.

As in previous years, there have been five general meetings and five business meetings of the Committee.

Papers on the following subjects have been read and discussed :—

"Shooting Stars and their Streams combined with Meteoric Showers." Mr. R. F. Griffiths.

"Planetary Motions." Captain Lee.

"The Temples of Egypt from an Astronomical Point of View." Miss A. M. M. Todd.

"Nebular Hypothesis, and the Action of the Tides." Mr. R. W. Chapman, M.A.

The subjects provided by the Question Box have received careful consideration ; the more important were :—

"The limits of time exposure in Astronomical Photography."

"The alleged atmosphere of the Moon."

"Greenwich Observatory and the production of the Nautical Almanack."

"The latitude and conditions under which the Moon may be seen to rise at the same hour on consecutive days."

The Astronomical Notes (first issued in July, 1892, and now in their sixth year of publication) have appeared regularly during the past 12 months, reflecting great credit on Capt. Lee and Mr. Griffiths, who are at the pains of preparing them.

Adopted at the Annual Meeting of the Society, held at the Observatory, Adelaide, on the evening of Thursday, the 2nd September, 1897.

C. Todd, President.
W. E. Cheesman, Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Balance Sheet for Year Ending 30th September, 1897.

	£	s.	d.		£	s.	d.
To Balance September, 1896	15	5	11	By Subscriptions Royal Society	8	10	0
" Subscriptions	6	5	0	" Postage	2	10	0
" Grant from Royal Society	15	0	0	" Stationery, etc.	1	3	6
" Interest	0	11	1	" Printing Monthly Notes	2	8	0
				" Balance	22	10	6
	£37	2	0		£37	2	0

Audited and found correct,
RICH. V. GRIFFITHS.
31st August, 1897.

Read and adopted,
C. TODD, President.
W. E. CHEESMAN, Sec. and Treasurer.
2nd September, 1897.

GENERAL INDEX.

[The species and genera, the names of which are printed in italics, are described as new.]

Aborigines of the Lower North of South Australia, Notes relating thereto, 72
Actæon *distinguendus*, 3; *evanescens*, 4; *funiculifer*, 2; olivellæformis, 4; puteolata, 5; scrobiculatus, 1; *subscalatus*, 2.
Agrotis *callimera*, 51; *gypsina*, 52.
Anarsia *druinopa*, 57; *holomela*, 57.
Anthropological Notes, 72.
Aphodius *Victoriæ*, 88.
Aristotelia *epipsila*, 58; *monostropha*, 57.
Asemantus *Leai*, 28.
Atriplex *Kochiana*, 87.
Azynaon Championi, 34.
Birds, List of, about Laura, 22.
Blackburn, Rev. T, New Genera and Species of Australian Coleoptera, 28, 88
Browne, Mr. J. H., Anthropological Notes, 72.
Bullinella *altiplica*, 14; *angustata*, 11; *aratula*, 12; *cuneopsis*, 13; exigua, 10; *infundibulata*, 14; *paucilineata*, 12; *phanerospira*, 15.
Cæsyra *argyraspis*, 54.
Calvert Expedition, botany of, 69; mollusca of, 101.
Cambrian Fossils, occurrence of, in Mount Lofty Range, 74.
Cape Jervis District, glacial features of, 61.
Car condensatus, 35.
Central Australia, evidences of glaciation in, 68
Ceratognathus *Krenchi*, 28.
Cleodora *eumela*, 59.
Coleoptera, new genera and species of, 28, 88.
Cooking Cress, aboriginal method of, 72.
Cosmotriche *brachycera*, 50.
Cossmann, Mr. M., Opisthobranchs of the Older Tertiary of Australia, 1
Cress, aboriginal method of cooking, 72.
Cubicorhynchus *tortipes*, 96.
Cuspidaria *simulans*, 44; Tasmanica, 44; *trigonalis*, 45.
Cylichnella *callosa*, 17.
David, Prof., and Mr. W. Howchin, glacial features of the Inman Valley, 61.
Diphucephala *Kershawi*, 89.
Elleschodes Hamiltoni, 37.
Erechthias *polyspila*, 60.
Eutornia *niphodes*, *stratimera*, 58.
Exangetus angustus, 93.
Foraminifera, recent researches bearing on the, 107.
Game, aboriginal method of obtaining, 72.
Gardenia *Keartlandi*, 70.
Gelechia *desmatra*, 56; *hemichlæna*, 55; *micradelpha*, 56; *micromela*, 55; *monoleuca*, 55; *ombrodes*, 56.
Glacial features, Central Australia, 68; Inman Valley and Cape Jervis district, 61.
Howchin, Mr. W. and Prof. David, glacial features of the Inman Valley, 61.
Howchin, Mr. W., on the occurrence of Lower Cambrian fossils in the Mount Lofty Range, 74; anniversary address, 106.
Hussey, Miss, some Port Elliot Plants, 100.
Hypena *mesochra*, 52.
Inman Valley, glacial features of, 61.
Isodon *novitius*, 28.
Lepidoptera, descriptions of new Australian species, 50.
Lower, Mr. Oswald, descriptions of new Australian Lepidoptera, 50.
Luciola *Courleyi*, 34.
Lucina *lacteola*, 48.
Macrohelodes *tasmanicus*, 33.
Maiden, J. H., on a new Atriplex from South Australia, 87
Microdes *typhopa*, 50.
Megapenthes futilis, 32.
Mollusca, Australian, critical remarks on, 40; of the Calvert Expedition, 101.
Morgan, Dr., List of birds about Laura, 22.
Mount Lofty Range, occurrence of Lower Cambrian fossils, 74.
Nenenia *thoracica*, 37; *virgata*, 38.
Opisthobranchs of the Older Tertiary of Australia, 1
Orophia *marmorea*, 54.
Ospidus *gibbus*, 94.
Pachygastra *Victoriæ*, 90.
Paraloea *maritima*, 51.
Paromarteon mutabile, 94.
Peltophora *leucoplaxa*, 53,
Penthea *Mastersi*, 97.
Philobota *monadella*, 53.
Phlœopola *pyrocentra*, 53.
Plants, of the Calvert Expedition, list of, 69; of the Port Elliot district, 100.
Plutella *ochroneura*, 59
Pogonias capnopa, *leucoma*, 59.
Proctammodes *minor*, 89.
Prostomis *intermedius*, 88.
Radiolaria in S. Australian rocks, 99, 101.
Rhytiphora *Spenceri*, 38.
Ringicula lactea, 18; *Tatei*, 19; *tenuilirata*, 12; *prælonga*, 20.
Roxania *bullæformis*, 17; *scrobiculata*, 16; Woodsi, 16.
Rushes, aboriginal method of steaming, 72.
Scaphander *Tatei*, 9.
Scarptia *lunulata*, 95.
Semiactæon *microplocus*, 5.
Steaming rushes, aboriginal method of, 72.
Stigmatium *bimaculatum*, 91
Stigmodera *campestris*, 31; Caroli, 31; *insularis*, 30; *pulchripes*, 31.
Tate, R., Critical remarks on some Australian Mollusca, 40.
Tate, Prof., evidences of glaciation in Central Australia, 68; list of plants of the Calvert Expedition, 69.
Tornatina *aptycha*, 8; involuta, 8; *longispira*, 7; *pachytycha*, 6.
Triploca ligata, 6.
Turritella *oxyacris*, 41.
Typhlopidæ of Australia, 25.
Typhlops *pinguis*, 25.
Umbrella *australiensis*, 20.
Volvulella *inflatior*, 9; *Tatei*, 8.
Waite, Mr., Notes on Australian Typhlopidæ, 25.
Xylopertha *hirticollis*, 92.
Ypsolophus *dryinodes*, 58.

TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

ERRATA.

pp. 80-89, and legend on Plate iv. (Mollusca) read Plate iv. *bis.*

p. 145, line 30, read were *never* seen.

p. 162, line 12 from bottom insert *at* after shot.

pp. 173, 175-8, 181, 183, insert *Brockman* before Creek.

p. 217, line 30, read Plate 6 instead of Plate 7.

Adelaide :

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. C. Rigby, care Messrs. Thos. Meadows & Co., 34, Milk Street, Cheapside, London."

TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XXII.

For 1897-98.

[With Seven Plates and Three Woodcuts.]

EDITED BY PROFESSOR R. TATE.

ISSUED DECEMBER, 1898.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. C. Rigby, care Messrs. Thos. Meadows & Co., 34, Milk Street, Cheapside, London."

Royal Society of South Australia.

Patron:

HER MAJESTY THE QUEEN.

OFFICERS.

[Elected October, 1898.]

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E. C. STIRLING, C.M.G., M.D., M.A., F.R.S.

CONTENTS.

PART I. (Issued July, 1898.)

PAGE

ETHERIDGE, R. : A further Cambrian Trilobite from Yorke Peninsula (Plate IV.) - - - - - - - - - 1

MASKELL, W. M. : On some Australian Insects of the Family Psyllidæ (Plates I.—III.) - - - - - - - 4

HOWCHIN, W. : Further Discoveries of Glacial Remains in South Australia - - - - - - - - - 12

BLACKBURN, REV. T. : New Genera and Species of Australian Coleoptera (XXIII.) - - - - - - - - 18

TATE, PROF. R. : On two Deep-level Deposits of Newer Pleistocene in South Australia - - - - - - - - 65

CORBIN, H. B. : Notes on the Graphitic Slates and associated Rocks in the Kalgoorlie District - - - - - - - 72

MAIDEN, J. H., and E. BETCHE : On a New Myoporum from South Australia - - - - - - - - - 76

PART II. (Issued December, 1898.)

TATE, PROF. R. : On Two New Cretaceous Bivalves - - - 77

——————— On Some Australian Species of Eulimidæ and Pyramidellidæ (Plate IV*a*. pars.) - - - 80

——————— On Some Recent and Fossil Australian Species of Philobrya (Plate IV*a*. pars.) - - - 86

TURNER, DR. A. JEFFERIS : Notes on Australian Lepidoptera (Plate V.) - - - - - - - - - 90

KOCH, MAX : A List of Plants collected on Mount Lyndhurst Run, S.A. - - - - - - - - - - 101

TATE, PROF. R. : On some New or Little-known South Australian Plants - - - - - - - - 119

——————— Dimorphism in two South Australian Cruciferous Plants - - - - - - 122

NORTH, A. J. : List of Birds collected by the Calvert Expedition in West Australia ; incl. Field Notes by G. A. Keartland - 125

MORGAN, DR. A. M. : Notes on the Nest and Eggs of *Porzana fluminea* - - - - - ; - - 193

TATE, PROF. R. : On deep-seated Eocene Strata in the Croydon and other Bores - - - - - - - - 194

TURNER, DR. A. JEFFERIS : Descriptions of New Microlepidoptera from Queensland - - - - - - - - 200

TORR, DR. W. G., and E. ASHBY: Descriptions of Seven New Species of South Australian Polyplacophora (Plates VI. and VII.) - 215

BLACKBURN, REV. T. : New Genera and Species of Australian Coleoptera (XXIV.) - - - - - - - - 221

BROWNE, J. HARRIS : Use of the Wedge by Aborigines - - 234

PAGE

ABSTRACT OF PROCEEDINGS - - - - - - 235
ANNUAL REPORT - - - - - - - 241
BALANCE SHEET - - - - - - - 242
PRESIDENTIAL ADDRESS - - - - - - 243
DONATIONS TO LIBRARY - - - - - - 250
LIST OF FELLOWS - - - - - - - 257

APPENDICES.

PROCEEDINGS, ANNUAL REPORT AND BALANCE OF THE FIELD NATURALISTS' SECTION - - - - - - 260
ASTRONOMICAL SECTION - - - - - - 265
GENERAL INDEX - - - - - - - 268

A Further Cambrian Trilobite from Yorke Peninsula.

By R. Etheridge, Junr., Hon. Fellow, Curator, Australian Museum, Sydney.

[Read November 2, 1897.]

Plate IV., figs. 1-3.

In 1884 Dr. Henry Woodward described* two Cambrian Trilobites from the Parara limestone of Yorke Peninsula, to which he gave the names of *Dolichometopus Tatei*, and *Conocephalites australis*. Since then Prof. R. Tate has described† two others from the same district—*Olenellus* (?) *Pritchardi* and *Microdiscus subsagittatus*.

Quite recently the Mr. W. Howchin transmitted to me a portion of the cephalic shield of another Trilobite, found by him at Ardrossan, that is in my opinion congeneric with Woodward's *C. australis*, but differing specifically, as I hope to show in the sequel, by a very important character. It will, however, be necessary in the first place to review our position in a generic sense. Dr. Woodward, following my determination of the Caroline Creek Trilobites, in Tasmania, referred his species to the genus *Conocephalites*, Barrande, both of us using this name as it was then commonly accepted. Through later researches amongst Cambrian Faunas, and the literature relating thereto, it has been ascertained that *Conocephalites* as a generic name will not stand, but must give place to that of *Ptychoparia*, Corda. No one has done more to clear up this point than have Messrs. F. B. Meek and C. D. Walcott, the latter the energetic director of the U.S. Geological Survey.

It appears that Zenker, in 1833, proposed the name of *Conocephalus* for a blind Trilobite, previously known as *Trilobites Sulzeri*, Schlottheim, and in 1839 Emmrich added a second species termed *Conocephalus striatus*, but possessing eyes. The incongruity of this appears to have struck Corda, who in 1847 pointed out that *Conocephalus* was, at the time of its enunciation, by Zenker, a preoccupied name, and proposed to substitute for the blind *Conocephalus* (*C. Sulzeri*) the name of *Conocoryphe*, and for the species provided with eyes (*Conocephalus striatus*) that of *Ptychoparia*. Subsequently the illustrious palæontologist Barrande, without separating the two forms, endeavoured to

* Geol. Mag., 1884, I. (3), p. 343.
† Trans. R. Soc. S. Austr., 1892, XV., Pl. II., p. 187.

surmount the difficulty by substituting the name *Conocephalites* for *Conocephalus**. In 1872 the late Mr. F. B. Meek, whose great care and perspicuity it is a pity more of us do not follow, adopted† Corda's names to the exclusion of Barrande's substituted one. Finally in the words of Mr. Walcott:—"This division [*i.e.*, of *Conocephalus*, Zenker] appears to me to be one demanded by the characters of the two types, and I fully endorse the opinion of the late Mr. F. B. Meek (. . . .) that Mr. Corda's names should be adopted, and the subsequent name Conocephalites, proposed by Mr. Barrande, in 1852, treated as a synonym.‡" In these terms I now employ the name *Ptychoparia* for *Conocephalites australis*, Woodw., and the fragmentary cephalic shield, lately obtained by Mr. Howchin, for which I propose the name of—

Ptychoparia Howchini, *sp. nov.* Pl. IV., figs. 1-3.

Sp. Char.—Glabella oblong, with sides almost parallel, narrowing but very slightly towards the front, which is evenly rounded; surface convex, and slightly arched in the middle line, most so posteriorly; furrows in three pairs, the first or posterior pair being the strongest marked, consisting of shallow depressions extending inwards nearly to the arched median line; second or middle pair still shallower and shorter, issuing from the axial grooves halfway between the first pair of furrows and proximal ends of the ocular ridges; third or anterior pair very short and faint, mere nicks in the lateral margins of the glabella, exactly opposite the proximal ends of the ocular ridges; basal lobes the most pronounced, the anterior lobe the largest, gradually sloping downwards to the well developed frontal furrow, which is wide and gently concave; fillet (*bourrelet*) of the limb prominent, thick, and rounded. Facial sutures anterior to the ocular ridges, straight (*i.e.*, parallel to the longer axis of the glabella), giving to the anterior portions of the united glabella and fixed cheeks a square appearance. Fixed cheeks gently convex, but not wholly preserved. Ocular ridges very well marked, broad and rather flat, very oblique to the longer axis of the glabella, bounded posteriorly by faint furrows. Axial furrows broad and not deep. Ornament consisting of granules of two orders, small, and minute respectively, interspersed with one another, and distributed over the whole surface, including the frontal furrow, limb, and ocular ridges.

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* Syst. Sil. Bohême, 1852, I. p. 415.

† 6th Ann. Report U.S. Geol. Survey Territories (Hayden's), 1872, p. 487. I regret that I have not this work at hand to refer to.

‡ Bull. U.S. Geol. Survey (Powell's), No. 10, 1884, p. 35.

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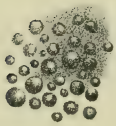

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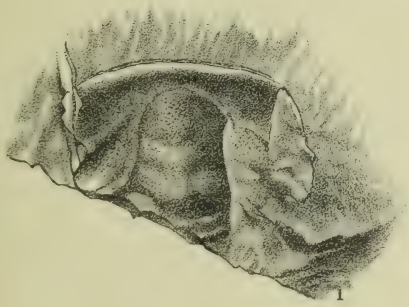

1

Obs.—The central portion of the cephalic shield, or cephalon, is all that is preserved of this interesting crustacean. The reason for separating it from *P. australis*, Woodw., sp., are the following:—(1.) Presence of the strong ocular ridges, absent in the latter; (2) direction of the facial sutures, which in *P. australis* are said to be "somewhat oblique," but here are certainly straight anterior to the ocular ridges, and do not commence near the anterior angle(s) of the glabella; (3) absence of oblique striæ in advance of the eyes; and (4) the position the eyes would occupy were they preserved. As regards the last point of difference in *P. australis* the anterior ends of the eyes are decidedly well forward, but I believe the corresponding points in *P. Howchini* will be found to be much more posterior in position. In most *Ptychopariæ* possessing ocular ridges, the anterior terminations of the eyes are situated at the distal or posterior ends of the ocular ridges. Now these points in *P. Howchini* are much more posterior than the corresponding positions in *P. australis*. Herein, in my opinion, lies a fundamental difference between the two types.

To *Ptychoparia* are also referable, in all probability, most, if not all the fragmentary cephalic shields, described by me from Caroline Creek, Tasmania.*

[The Type specimen is in the Australian Museum, Sydney, presented by Mr. Howchin.]

EXPLANATION TO PLATE IV.

PTYCHOPARIA HOWCHINI.

Fig.

1. The cephalon or head shield as far as preserved, front view.
2. The same, side view.
3. Granules forming the sculpture, much enlarged.

* Proc. R. Soc. Tas. for 1882 (1883), pp. 153-157.

On Some Australian Insects of the Family Psyllidæ.*

By W. M. Maskell, Hon. Correspondent.

[Read December 7, 1897.]

Plates I.–III.

The Australasian Psyllidæ have not, as far as I am aware, been sufficiently studied. T. Dobson, in the Papers and Proceedings of the Royal Society of Van Diemen's Land, in 1850, wrote upon the waxy secretion, or "manna," produced by some Tasmanian insects, and gave some figures both of this manna and of adult insects; but he seems to have known of only three species. I possess some waxy shields corresponding to his figures 3 and 5, but have not their adults; and it is not possible to make out from his figures 4 and 6 exactly what genera or species are represented by them. Since his time I do not know of any systematic attempt to describe Psyllidæ in this part of the world, except my own paper in the Transactions of the New Zealand Institute, 1889, in which I reported four new species, one of which was probably an importation from Australia. Mr. E. Rübsaamen, in the Berlin Entom. Zeitschrift, 1893, has a paper on some galls on Eucalyptus, amongst a number of which he mentions one from Australia which contained a Psyllid pupa; but no adult was found. I gathered from a letter a few years ago from the late Mr. Olliff that he proposed to form a new genus, "*Xylolyma*," for some of the species which have waxy shields; but the specimens which I possess of four of these would belong rather to Signoret's proposed genus "*Spondyliaspis*." Probably, however, the adults of these forms, when found, would not be separable from the ordinary Psyllid genera, like *Asphalara tecta* of the present paper; and both *Spondyliaspis* and *Xylolyma* would be abandoned. I think that Mr. Olliff never actually published anything on his suggested genus. If any other papers exist on Australasian Psyllidæ, I have not seen them, nor can I find references to any in the "Zoological Record." But there must be many fine species yet to be discovered in these regions.

The principal character for *generic* separation in this family is the venation of the forewing of the adult. In order to illustrate

* This is a posthumous article, the author having died before receipt of proofs.—[Ed.]

this point in the present paper I have inserted in the figures of wings letters denoting the parts referred to in the text. Although I could not, on account of the dark patches, put such letters in fig. 3, but the letters of figs. 10 and 17 will serve also for them. I have also placed letters to the figures of the male genitalia.

Genus Psylla, *Geoffr.*

Head prolonged anteriorly in two processes. Stalk of the cubital vein in the forewing shorter than the stalk of the sub-costal vein.

Psylla Lidgetti, *sp. nov.* Pl. i., figs. 1-4.

Insects not forming any gall or shield.

Pupa naked, active (Fig. 1). Colour, dorsally, dark brownish-yellow, with a dark-brown patch on the head on each side of a longitudinal light stripe; thorax with an anterior brown patch and six others in two rows; abdomen transversely banded with brown. Wing-cases dark-brown, almost black. Ventrally, the general colour is dark-red. Antennæ and feet greenish, the terminal joints of each dark-brown. Eyes red. The general form of the insect in this stage is elliptical, the head smoothly rounded in front, the abdomen terminating in a minute projection. Antennæ as long as the whole body, rather thick, with eight joints, six of which are ringed and bear numerous hairs, and on the last are two unequal spines. Feet thick and swollen, rather short; the dimerous tarsus, claws and pad are normal of the genus. The margin of the whole body and head is fringed with numerous short hairs, and a number of these are also scattered over all the dorsum. Length of the pupa about $1\frac{1}{2}$ mm. $= \frac{1}{16}$ inch.

The adult insect (fig. 2) is of a general brown colour with some irregular patches of reddish yellow; the antennæ and feet yellow; eyes red. Head broader than long, somewhat depressed in front and produced beneath in two short roundly-conical processes. Eyes semi-globular, sessile, numerously facetted. Antennæ moderately long and slender, with ten joints, of which eight are ringed. Feet presenting no special characters. In the forewings the sides are nearly parallel, each side very slightly concave in the middle, the ends broadly rounded. The primary stalk of the veins reaches to about one-fourth of the length of the wing; the stalk of the cubitus* is about one-half the length of the stalk of the sub-costa; the sub-costa forks close to the margin

* On account of the dark bands on the wing in fig. 3 the veins cannot be well distinguished by lettering; but the letters in figs. 10 and 17 will answer also for this.

with one short branch and another almost parallel to the margin, but there is no pterostigma in the enclosed space; the radius is wavy, joining the costal margin about the apex; the upper main branch of the cubitus is convex, forking at two-thirds of its length and its upper secondary branch reaches the margin a little below the apex; the lower main branch forks at about three-fourths of its length, the shorter secondary branch turning sharply to the margin, the longer extremely convex; the claval vein is short and very slightly concave. On the surface of the wing are several brown patches; a few, small and scattered, near the base of the wing; one across the middle, much broader near the costal margin and narrow near the dorsal margin; a third, towards the extremity, very broad at the dorsal margin; and a fourth, very small, separated from the third by a crescent-shaped hyaline space, just above the apex. The hind wings are hyaline, with only the usual three longitudinal faint veins. The genitalia of the male insect (fig. 4) consists of the usual dorsal processes; the genital-plate *(a)* is curved slightly backwards, with its basal portion very broadly rounded posteriorly; the forceps *(b)* consists of two narrow cylindrical processes bent slightly forwards; between these organs is the penis (not shown in the figure); the abdominal extremity *(c)* is blunt and turned upwards. The genitalia of the female have not been observed, but in all probability they do not differ greatly from those of the next species.

Habitat.—In Australia, on *Acacia implexa.* My specimens were sent by Mr. Lidgett, of Myrniong, Victoria, from whom I have ventured to name the insect.

The differences between this and *P. acaciæ* will be readily seen by comparison of the wings and the genitalia, although in colour and in habit the two do not greatly differ. The brown bands on the forewing of *P. Lidgetti* are much more close and conspicuous than the scattered patches on *P. acaciæ*, and the dorsal hairs of the pupa are also distinctive.

Genus Aphalara, *Förster.*

Head either swollen or produced in conical processes; stalk of cubitus in forewing longer than the stalk of the subcosta; radius curved.

I follow F. Löw in including amongst the generic characters the processes of the head. Scott (Trans. Entom. Soc., London, 1876) says:—"Face not lobate."

Aphalara tecta, *sp. nov.* Pl. ii., figs. 5-10.

Insects covered in the pupal stage by a waxy scale or shield. The colour of this shield is reddish-yellow; the form is sub-

elliptical or pear-shaped, tapering anteriorly, somewhat convex, the secretion exhibiting very fine transverse striations, and in some specimens also a few obscure corrugations radiating from the pointed end; the margin is smooth all round; the average length is about 4 mm. = $\frac{1}{6}$ inch, with a width at the broadest part of about 3 mm. The texture of the dorsal part is thin and not very solid; the marginal part is thickened by an accretion which, on turning over the shield, is seen to form a ventral scale not extending over the whole median space.

The enclosed pupa is yellow, both dorsally and ventrally, and the antennæ and feet are likewise yellow; the wing-cases are dark-brown. On the dorsum there is a short transverse black band at about the separation of the thorax and the abdomen; on the head and thorax are two longitudinal rows of black quadrangular spots, and on the abdomen two similar rows of short black bands in pairs; the extremity of the abdomen bears a black patch. On the abdominal margin is a quantity of white cottony secretion, not forming a fringe. Antennæ moderate, with eight joints, of which six are ringed. Feet short and thick.

The adult female is yellow, with the thorax and abdomen marked dorsally with a few black patches; eyes reddish, facetted, semiglobular, sessile. Head broader than long, depressed in front, produced beneath in two rather long sub-cylindrical processes. Antennæ yellow, with brown tips, of the usual ten joints. Feet yellow, normal. Forewings hyaline, without spots or bands; the primary stalk of the veins (*a b*) is very short, only about one-sixth the length of the wing; the stalk of the cubitus (*b c*) is a little longer than the stalk of the sub-costa (*b d*); the sub-costa (*d g*) forks close to the margin; the radius (*d f*) is rather convex, and reaches the margin near the apex, and a little above it; the upper branch of the cubitus (*c e*, *c h*) forks at some distance from the margin, its branches bending sharply downwards; the lower cubital branch (*c k*, *c m*) forks at a short distance from its source, and its longer branch is not very convex; the clavus (*a n*) is concave. Hindwings hyaline, with the normal three longitudinal veins. Genitalia of the male (fig. 14) with a sub-conical genital-plate, the sides straight, the end truncate; the forceps is very broadly dilated at its tips, and is bent sharply forward beyond the genital-plate. Genitalia of the female formed of two simple conical valves enclosing the ovipositor.

Habitat.—On *Eucalyptus stuartiana*. My specimens were sent by Mr. French from Victoria, the exact locality not mentioned.

The appearance of the pupal shield in this species might cause it to be easily mistaken for a coccid of the genera *Chionaspis* or

Mytilaspis, but examination of the enclosed pupa shows it to be undoubtedly a Psyllid.

Genus Trioza, *Förster*.

Head produced in two conical processes ; stalk of the cubitus in forewing entirely wanting.

Trioza multitudinea, *Tepper*. Pl. iii., figs. 11-17.

Ascelis (?) multitudinea, *Tepper*, Trans. Roy. Soc. South Australia, 1893. Figs. 15-21.

Insects forming large galls on leaves, in the pupal stage. These galls, in the fresh state, have a greenish colour, but when quite mature or old they become red, or reddish-yellow; the normal form is subglobular ; rarely, specimens are slender and cylindrical ; the outer surface is rough and wrinkled ; the texture is soft and leathery. Each gall usually contains a single cavity—sometimes there are two or three cavities ; the interior walls are always quite smooth. The gall is attached to the leaf by a narrow base, and on the other side of the leaf there is usually a depression, but this is not entirely constant. The galls vary in size from a diameter of 3 mm. = $\frac{1}{8}$ inch, to 12 or more mm. And I have seen a few almost 1 inch.

Within the galls are found the pupæ, which when alive have dorsally a palish-brown colour, banded with faint yellow bars ; dead specimens are dark-brown, and the bands almost obsolete ; ventrally the colour is pale yellow, the feet and antennæ the same. Dorsally the wing-covers are plainly visible, also the eyes, which in fresh specimens are bluish. The margin of the pupa all round bears a fringe of short yellow hairs. The general form is elliptical, with a length of about 2 mm. = $\frac{1}{12}$ inch. There is no special character in the antennæ and feet, which indeed do not vary greatly in the genus Trioza.

The larva has not been observed.

The adult female is almost entirely yellow, with a darker tinge on the thorax, dorsally, and at the extremities of the antennæ and feet; the eyes are red, semi-globular, facetted, placed on a short tubercular base. The head is broader than long, depressed in front and produced beneath in two moderately long sub-conical processes ; the rostrum is cylindro-conical. The antennæ have 10 joints, all elongated, sub-equal and ringed, except the two first, which are short and smooth ; on the last joint are two short sub-equal spines. Feet normal, with dimerous tarsi and double claws. The genitalia of the female (fig. 19) consist of two longish, sharply-pointed processes enclosing the ovipositor ; one of these is rather shorter than the other ; both are numerously ringed, the

outer margins of the rings smooth to the tip; the inner margins are also smooth for about halfway, but those near the tip are very sharply serratulate. Forewings hyaline, with a very minute sparse punctuation and without marginal hairs; the dorsal margin (fig. 21, *a m h*) is slightly concave in the middle, the costal margin (*a g e*) is nearly regularly convex; the primary stalk of the veins (*a b*) extends to nearly one-third of the wing; the cubitus (*b e*, *b k*) has no stalk, forking directly with the subcosta (at *b*); the upper branch of the cubitus (*b e*, *b h*) is convex, forking near the apex, the terminal branches reaching the margin at about equal distances from the apex; the lower branch forks near the dorsal margin with one short branch (to *m*) and one longer and convex (to *k*); the radius (*d f*) is very slightly wavy, and leaves the subcosta (*b g*) at about half the length of the latter; the clavus (*a n*) is nearly straight; the costal vein (*a g e h n*) runs all round the margin. The hindwings are hyaline, with three faint longitudinal veins, of which the posterior one is forked. The genitalia of the male have the usual dorsal processes; the genital plate (*a*) is broad at the base, with slightly emarginate tapering sides ending in two divergent sub-conical teeth; the forceps (*b*) is somewhat similar, but narrower, and is bent forwards almost to the plate.

The length of this insect is about 2 mm = $\frac{1}{12}$ inch, with an expanse of wings about 5 mm.

Habitat.—In Australia, on various species of *Eucalyptus*; principally, I believe, on what is known as "*Stringybark*." Mr. Tepper sent me specimens from Marino, South Australia; Mr. Froggatt, from New South Wales; Mr. French, from Victoria; and Mr. H. S. Dove, from Tasmania.

The generic position of this insect is clearly defined by the character of the wings, which are quite normal of the genus *Trioza*. Specifically, it may be distinguished by the genitalia of the female, which seems to be different from any hitherto reported, as well as by the character of the galls which the pupæ inhabit. Psyllidæ, as has been found of late years, are almost as varied as Coccidæ in their ways of covering themselves; and this seems to be especially the case with the Australasian forms, for I do not find that Low and Scott or Riley draw particular attention to this point respecting Psyllidæ of other regions. In this part of the globe, however, we have some uncovered (*e.g. Rhinocola fuchsiæ* in New Zealand), some with cottony secretion (as *Rhinocola eucalypti* in N.Z.), some excavating pits for themselves (as some undetermined Australian forms), some forming elaborate waxy tests of elegant design (as the species described from Tasmania by Dobson in 1850 and others not yet fully worked out), and some again, such as the one now under dis-

cussion, forming large and conspicuous galls. I possess several specimens of very beautiful waxy pupa-cases, of which one is certainly that for which Signoret founded his genus *Spondyliaspis* in 1879; but some of these are empty, and in others there are only dead pupæ, so that I cannot well describe them. It would be worth while for an Australian entomologist to take up the study of these forms, and to describe the adults.

In 1893 Mr. J. G. O. Tepper published in the Transactions of this Society a paper on "South Australian Brachyscelid Galls," in which he described one species as of the genus *Ascelis*, namely, *A. multitudinea*. Having previously had galls of this (sent by Mr. French), and having extracted from them only Psyllid pupæ, I was convinced that Mr. Tepper's description of them to the Coccidæ could not be correct, and I asked him to let me have specimens, which he very kindly did at once. From the galls which he sent me I bred four adult insects, which are those described above. Mr. Tepper must have been led into his error on account of a principle which he laid down in his paper. Speaking of some of my Coccid genera—*Frenchia*, *Cylindrococcus*, &c.,—he said:—"*On account of a general similarity of habit*, I consider that they also should be included in the family [Brachyscelidæ]. They form woody galls similar in structure to those of *Brachyscelis*." Undoubtedly, the galls of *Trioza multitudinea* might easily be taken as very closely allied to those of such species as *Brachyscelis nux* or *Opisthoscelis subrotunda* or others, as long as the enclosed insects are not examined. But the study of these at once shows that the principle embodied in the words just quoted (and which I have italicised) is essentially erroneous. Clearly both Psyllidæ and Coccidæ have a "general similarity of habit;" yet it is quite impossible to unite the two. There is only one point as to which I am in doubt. Mr. Tepper describes not only the gall of his species, but also the enclosed insect. This, he says, is "yellow, rather flat, elliptical, with long hairs . . antennæ dorsal . . legs none . . last segment of abdomen deeply emarginate, the sides forming thick, obtusely acuminate appendages, without bristles or setæ." What was this insect? The description does not seem like that of a Coccid, and the figure given by Mr. Tepper (in his Plate V., fig. 4 *d*) has no Coccid features. In all the galls of this species opened by me I have found Psyllid pupæ, in which the legs are a very conspicuous character; but in some I found also yellow, elliptical things, with dorsal antennæ, which were pupæ of parasites, and from one of which emerged a long-bodied, long-winged fly of some Hymenopterous genus.

I think, on the whole, that I have rightly attached Mr. Tepper's insect to *Trioza*. The specific name given by him is quite appropriate, and I have not disturbed it.

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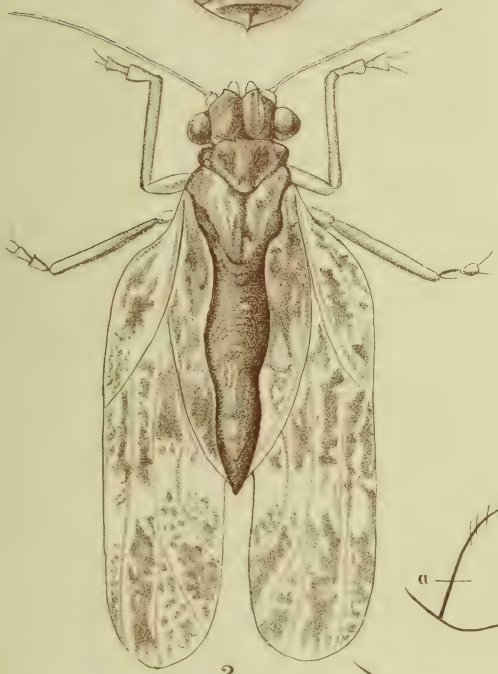

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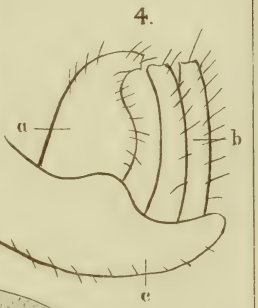

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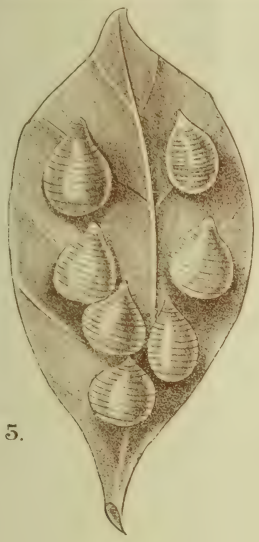

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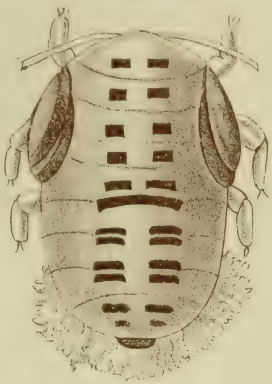

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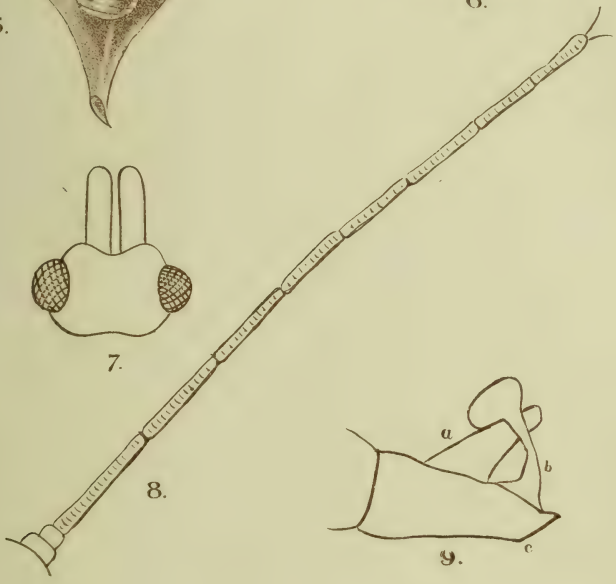

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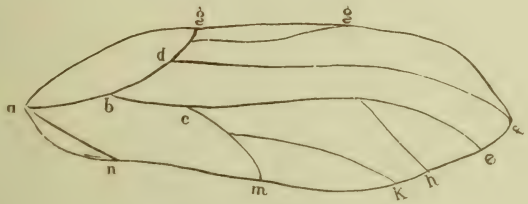

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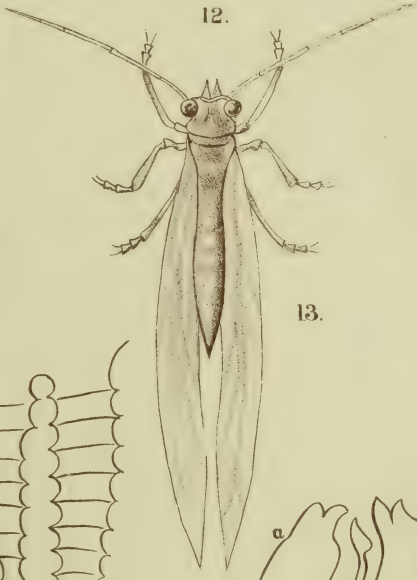

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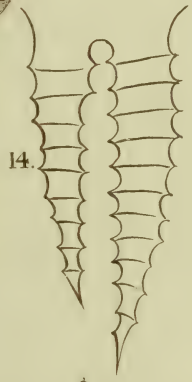

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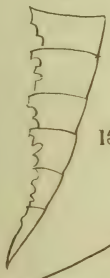

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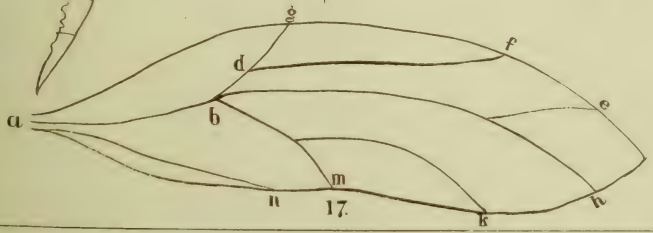

17.

INDEX TO FIGURES.

NOTE.—In the figures of wings *a b* is the "primary stalk;" *b c* is the "stalk of the cubitus;" *b d* is the "stalk of the subcosta;" *b g*, *b f*, is the "subcosta;" *a f* is the "radius;" *c e*, *c h* is the "upper branch of the cubitus;" *c k*, *c m* is the "lower branch of the cubitus;" *a n* is the clavus."

In the figures of genitalia, *a* is the "genital-plate;" *b* is the "forceps;" *c* is the "abdominal extremity."

All the figures are highly magnified, except fig. 16.

Fig.
1. *Psylla Lidgetti*, pupa.
2. " " adult insect, dorsal view.
3. " " forewing.
4. " " genitalia of male, side view.
5. *Aphalara tecta*, shields on leaf.
6. " " pupa.
7. " " head of adult.
8. " " antenna.
9. " " genitalia of male.
10. " " forewing.
11. *Trioza multitudinea*, galls on leaf.
12. " " pupa.
13. " " adult insect.
14. " " genitalia of female.
15. " " " " more highly magnified.
16. " " genitalia of male.
17. " " forewing.

Further Discoveries of Glacial Remains in South Australia.

By Walter Howchin, F.G.S.

[Read May 3, 1898.]

The Inman and Hindmarsh Rivers enter the sea within one-and-a-half miles from each other at Encounter Bay, with the town of Port Victor situated between their outlets. The Inman takes its rise in the Bald Hills and follows a E.S.E. course, whilst the Hindmarsh River rises in a series of springs among the "Tiers," twelve miles north of Port Victor, and has a course almost due north and south.

In a previous paper read before the Society* it has been shown that the Inman valley carries abundant evidences of former glacial conditions, and that the trend of the ice was from south to north. Ice-borne stones have been traced rounding Cape Jervis, and studding the eastern shores of the Gulf. Similar erratics have been carried overland, across the Cape Jervis peninsula, and northward as far as Hallets Cove, at least fifty miles from their source. All the evidence thus obtained pointed to the fact that the granite ridge of the southern coast had been a centre of dispersion for the ice, and as the Hindmarsh Valley, like the Inman, is included in the radii from this centre, it seemed highly probable that it would supply additional proofs of the extent of this extinct icefield.

To test this point by direct observation, I spent a few days last month in a walking tour through the Hindmarsh Valley and Ranges, across to Myponga and Sellick's Hill. The superficial deposits to some extent mask the geological features of the Valley, yet the results show that the Hindmarsh Valley has been under an equal measure of glaciation as the Inman Valley.

The geological formations of the district are as follows:—

Recent.—1. River wash, consisting mainly of fine silt.

Newer Tertiary.—2. Horizontal beds of variegated marls and sands, with thin lenticular beds of fine gravel.

Older Tertiary.—3. Pink-coloured fossiliferous limestone (limited to the head waters of the Hindmarsh).

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* Trans. Roy. Soc., S. Aus., xxi, p. 61.

Geological Horizon Doubtful.—4. Glacial clays and sandstones, with erratics.

Primary.—5. Metamorphic quartzites, sometimes passing into schistose structure.

In no part of its course (south of Nettle's Hill) does the Hindmarsh River flow over the Primary rocks, and consequently no opportunity presented itself of finding such examples of polished ice pavements as occur in the Inman. The Valley flats and minor hills are composed of Newer Tertiary beds, as described above. In the lower reaches of the Valley these beds attain a considerable thickness, and effectually obscure the underlying beds. Good sections may be seen in washaways and steep cliffs up to 50 ft. in height, and it is in these Newer Tertiary beds that the river has cut its way and laid down more or less a secondary deposit of recent alluvial wash.

In some parts of the valley, especially on the higher flats, the surface is a loose white sand, densely occupied by scrub.

On all sides there were presented the strongest proofs that in post glacial times the valley has been subjected to much silting up, the glacial deposits have been wasted, rearranged, or blinded by an excess of cover, and the wonder is that any evidence of their presence has been left to tell its tale.

A very large granite boulder was met with on Mr. Alexander Hutchison's land, distant from the river about three-quarters of a mile, on its western banks, and immediately on the line of fence separating Sections 205 and 218, Hundred of Encounter Bay. The stone was originally so large that it formed an obstacle to the fence, and had to be blasted before the wire could be carried through. Two shots had been inserted, reducing the part exposed above ground to half a dozen pieces, the largest of which measures 4 ft. x 3 ft. x 3 ft. The base is still set firmly in the ground, and the part exposed measures seven feet across. It is a red granite with the characteristic features of the Port Victor and Port Elliot granites.

Two other large granite boulders were pointed out to me by Mr. Hutchison occuring on his land on the eastern side of the river. One of these was situated near the eastern edge of Section 117, Hundred of Goolwa, and the other near the middle of the adjacent Section 143. Both boulders are nearly even with the ground, and have an exposure of five feet and four feet respectively, but it was apparent that if the soil had been removed their dimensions would have been shown to be much greater.

Following the road for about two miles, and rounding the prominent spur of the Peeralilla Hill, as the road passes through Section 136, a low cutting on the right hand side of the road exposes a drift bed containing many erratics, including a

granite boulder which is uncovered to the extent of about 2 ft. It is not unlikely that this bank of drift has slipped down from higher ground.

A few hundred yards further north, at a point nearly opposite the gates of Beaudesert, occupied by Mrs. Hutchnison, two large granite boulders are seen on the right hand side of the road, near the crest of the foot hills. They are at an elevation of about 80 ft. above the road, and as they exhibit flat faces toward each other, it is very likely that they originally formed one block which has split along a line of weakness into two. They are now 3 ft. apart (one having slid a little down the bank), and are about of equal size, measuring, respectively, 7 ft. x 3 ft. above ground.

Miss Hutchinson, of Beaudesert, kindly directed my attention to a very fine erratic which occupies the bed of a dry tributary of the river about a quarter of a mile below the farmstead. It is a solid block of granite, 6 ft. x 5 ft. x 3 ft. 6 ins. high, and has a fragment lying beside it which appears to have at one time formed part of the larger mass. The boulder rests on a whitish sandstone, somewhat flaggy in structure, which is set irregularly with erratics of all sizes. This glacial sandstone is well seen about ten yards further down the creek, where it occupies the whole bed of the stream and has a dip of 18° N.N.E. Between this spot and the Beaudesert farmhouse there is a bed of laminated black clay in the bottom of the Hindmarsh River which has much the appearance of the black shale of the Inman Valley, where it is found to be intercalated with the glacial sandstone.

Half a mile further north the glacial sandstones are said to be again exposed in the bed of the river at the confluence of a tributary, and the retaining wall of the Mount Billy bridge, which crosses the stream in Section 138, Hundred of Goolwa, rests upon the same beds. Large granite boulders, I was told, occur on the top of the foothills to the right of the Mount Billy bridge, but I had not the opportunity of visiting them.

On Mr. Abel Gray's property, at Condolley Farm, Section 59, Hundred of Encounter Bay, there is an exposure of glacial sandstone which forms a cliff 15 feet high. The beds have a dip 12° S., 3° E. The stone is moderately hard, and Mr. Gray when building his house put in two shots to test the quality of the stone for building purposes, but it proved too friable for use. The beds at this place are comparatively free from large stones, but several small granite boulders were seen on the surface which had probably been weathered out from the upper beds, the largest of which measured 18 inches in length.

Mr. Gray informed me that the same sandstone could be seen in the creek on the other side of the Green Hill opposite his house,

and also at a more distant locality at the Square Water Hole, on the road to Willunga, about 20 chains N.N.W. of the Old Square Water Hole House, and five to six chains from the Adelaide road on the left hand side going north. The surface of the stone at the latter place, he states, has been loosened by weathering, and is more or less covered by blown sand.

It seems highly probable that the extensive deposits of Newer Tertiary sand beds, which have to a great extent choked the Hindmarsh Valley, have been derived as rearranged material from the glacial sandstones, which at several points are seen to underlie them.

The Hindmarsh Valley proper comes to an abrupt termination at Nettle's Hill, about nine miles from Port Victor. After passing Mount Billy Bridge, the road makes a steep ascent of several hundred feet, and enters on a hilly plateau known as the "Hindmarsh Tiers." I saw no granite boulders, nor could I hear of any having been noticed in these Ranges. On the hilltops there frequently occur, however, beds of sandy clay, in which pebbles are promiscuously distributed. These pebbles are much worn, and in some examples appear to be facetted. They are, indeed, exactly similar to the rounded and facetted pebbles which occur plentifully in undoubted glacial drift at Yankalilla and Cape Jervis. I am by no means certain that they have any connection with the glacial phenomena of the district, but their occurrence is peculiar and worth recording. Similar beds with pebbles distributed irregularly through them can be seen at Myponga on the southern flanks of Sellick's Hill.

At the head of the Hindmarsh River there occurs a very remarkable fossiliferous limestone of Eocene age. The stone consists almost entirely of organic remains, forming a very pure carbonate of lime often of a delicate pink colour, and is quarried in the neighbourhood and burnt for lime. The outcrop, which is of an inconspicuous character, is confined to the sides of a narrow creek on land farmed by Mr. Geo. Maslin, within Sections 600 and 601, Hundred of Encounter Bay. The rock is in places massive, and is exposed to a height of twenty feet above the level of the stream, but as the stream has not cut its way to the base of the formation its thickness is unknown. The same limestone can also be seen in a small tributary a little further to the west, but I did not visit the place. This limestone has been generally spoken of as the "Mount Jagged limestone," but it is situated more than three miles from Mount Jagged and is nearer Mount Cone, which is a more considerable elevation. The spot where it occurs is marked by several strong springs which form the headwaters of the Hindmarsh River.

The considerable altitude of this limestone invests it with special interest. The numerous Eocene outcrops of the colony are, with this exception, all within a height not exceeding 200 feet above sea level, whilst the Eocene outlier of the Upper Hindmarsh cannot be much less than 1000 feet. The water parting of this elevated plateau occurs about three miles north of the Eocene outcrop, reaching its greatest altitude in Mount Cone and Mount Jagged, the former, according to the Survey Office records, is 1,380 feet above sea level, and the latter 1,230 feet. The Peeralilla Hill, which is three miles further down the valley than the outcrop in question, has a height of 910 feet. The exact height of the Eocene beds is not known, but is probably somewhere between 800 feet and 1000 feet.

I hoped, in visiting this outcrop, some evidences might be found that would throw light on the stratigraphical relationship of the Eocene limestone to the glacial beds of the district, but neither the base nor the upper limits of the Lower Tertiary beds were exposed. A great thickness of rich loamy soil forms the banks of the creek at this place, and the upper posts of limestones have been weathered into large boulders (after the manner of limestones), with soil as cover and filling the intermediate spaces. The occurence of Eocene beds at an altitude which gives them a unique position for rocks of this age in southern Australia raises some interesting questions in stratigraphical geology, concerning which we have at present no satisfactory solution.*

It is worthy of note that a few months ago I picked up several sea-worn boulders of Eocene limestone of a pinky colour on the beach near Sellick's Hill. In some respects they bore a close resemblance to the limestone of the Upper Hindmarsh, but differed from the latter in containing rounded grains of quartz. There are Eocene beds on the beach near where the pink limestone boulders were found, but they appeared to possess very distinct lithological features from the rolled fragments. The origin of these sea-worn boulders is, therefore, a little uncertain. If derived from the upland outcrop they must have crossed the watershed. It is perhaps more likely that they have a local origin in some calcareous band which, when broken up and exposed to sea water for some time have suffered some alteration in their ferruginous constituents, and, by oxidation, have developed a pink colour. Such a change, so far as I know, is not common in our Eocene limestones, and may be taken into account when an

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* Professor Tate says—"Catyclismal disturbance must account for the presence of fossiliferous beds of this age (Eocene) in the Encounter Bay district at elevations above 600 feet." Roy. Soc., N.S. Wales, Vol. xxii, p. 242. (1888).

attempt is made to correlate stratigraphically these upland Eocenes with their low-level equivalents.

The observations detailed in this paper, whilst enlarging our knowledge of the geographical extent of the extinct ice-field of South Australia, unfortunately, do not throw any additional light on the age at which the glaciation took place or the kind of agency by which the ice operated. We may reasonably expect, however, that when the thick and varied deposits of this period have been submitted to careful examination these two questions will be solved.

Further Notes on Australian Coleoptera with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read May 3, 1898.]

XXIII.

LAMELLICORNES.

MELOLONTHINI (Tribe).

This aggregate of genera appertains, in Lacordaire's arrangement, to the second "Legion" of the family "*Lamellicornes*" on account of some of the abdominal stigmata being placed on the ventral segments. Lacordaire divides this second "Legion" into "Tribes," of which the *Melolonthini* is one and is distinguished by those of the abdominal stigmata which are placed on the ventral segments not diverging strongly from the line in which the dorsal and ventral segments meet. The "Tribe" *Melolonthini* is divided by Lacordaire into "sub-tribes," of which, so far as I know, only four are represented in Australia,—viz. *Systellopides* (separated since Lacordaire's time from his sub-tribe *Pachypodides*) *Sericides*, *Sericoides*, and *Melolonthides* (true). The Systellopide, are distinguished from the rest of the above-named sub-tribes by the atrophy of the maxillary lobe in combination with the position of the labrum on the same plane with the clypeus; while the true *Melolonthides* differ from the remaining two by the front coxæ being (not conical and prominent but) transverse. Lacordaire distinguishes the *Sericides* and *Sericoides* by the relation between their clypeus and labrum, the latter being in the *Sericides* intimately connected (soudé) with the clypeus so as to be "indistinct" while in the *Sericoides* it is "free." Here it is to be noted (as Lacordaire remarks) that in some genera (e.g. *Diphucephala*) the clypeus is divided by a suture which gives its front part the appearance of a free labrum, and it must be admitted that there are genera in which it is exceedingly difficult to say that the piece in question is not the real labrum. As an instance I would mention *Phyllotocus*. Comparing an example of this genus with some of the *Systellopides* I cannot discover any difference of structure justifying the assertion that the front piece of the head is a part of the clypeus in one and the labrum in the other. It must be remembered doubtless that Lacordaire

does not appear to have actually examined any *Systellopid* species, and that it is Dr. Sharp who states that it is the labrum which in the *Systellopides* is attached to the front of the clypeus and is on the same level with it. I do not venture to assert that either of these accomplished entomologists (both extremely eminent anatomists) is wrong,—which would be highly presumptuous in any but a specialist on anatomy,—but I draw attention to the matter in order to show that Lacordaire's method of distinguishing the *Sericides* from the *Sericoides* is at any rate not easy of application to the ordinary student.

However, there can be no doubt that these sub-tribes of *Melolonthini* form two very natural and distinct aggregates in each of which moreover there is a highly characteristic relation between the clypeus and labrum, and I think this can be expressed in terms (different from those of Lacordaire) which at any rate as a supplementary statement of characters will be found useful inasmuch as it avoids the necessity of determining in difficult cases whether the front piece of the head is or is not a true labrum.

In the *Sericides*, whether we regard the front piece of the head as a labrum or follow Lacordaire in regarding it as an extension of the clypeus and the labrum as invisible, it stands good that the front face of the front piece of the head looked at from in front has very little downward vertical or oblique development, so that the insertion of the palpi is very little below the plane of the clypeus, but in the *Sericoides* it is far otherwise. In them (and also in the true *Melolonthides*), the labrum is attached to the clypeus at a position considerably below the plane of the upper surface of the latter, so that if the latter be looked at from in front it seems to be strongly thickened downward (in some species obliquely downward and hindward) and the labrum is attached to it at a point considerably down this thickened front face. As in the *Sericides* so in *Sericoides* there are genera in which the labrum is not very easy to see as an organ distinct from the clypeus, and moreover the labrum itself is of very variable form in the *Sericoides* (in some genera even becoming an erect lamina the apex of which rises considerably *above* the plane of the clypeus); nevertheless a result of the attachment of the *base* of the labrum being as indicated above is that the palpi are inserted considerably below the plane of the upper surface of the clypeus and all the observations I have made confirm the opinion that their being so inserted is reliable evidence that the relation of the clypeus and the labrum are of the *Sericoid* rather than the *Sericid* type.

The adoption of this view of the distinctive characters of the Australian *Sericides* and *Sericoides* involves some little re-adjust-

ment of the species to be attributed to those sub-tribes respectively, inasmuch as it renders necessary the removal of *Mœchidius* from the former to the latter and of *Pachytricha* and *Phœnognatha* from the latter to the former. These transfers, however, appear to me to tend altogether to a more natural classification. All the three genera affected by it are extremely isolated in their characters, and it is probably open to question whether each of them may not eventually be regarded as representing a distinct sub-tribe, but even so it seems to me that in a natural arrangement the sub-tribes containing *Phœnognatha* and *Pachytricha* would stand before the *Sericides* in the *Melolonthini*, and that containing *Mœchidius* certainly after the *Sericoides*. If the arrangement I thus suggest be followed it will have the effect of associating together in the *Sericides* species having remarkable sexual characters in the front tarsi (unless *Phœnognatha* of which I know only one sex be an exception) and in the *Sericoides* species not exhibiting such sexual characters (or at least only in a slight degree and in occasional members of a genus) and also of making the *Sericides* of Australia consist entirely (unless *Epholcis Phœnognatha* and *Pachytricha*, which I have not seen alive, be exceptions) of genuinely flower-frequenting day-fliers, and the *Sericoides* (so far as I know, and I have collected nearly all the genera) contain no genus at all with similar habits ; for although a few *Heteronyces* and *Liparetri* are sometimes to be met with on flowers (as indeed what insect are not ? I once found some flowers thickly studded with a *Hydrophilid*) certainly neither *Liparetrus* nor *Heteronyx* can be reckoned a flower-frequenting genus.

Since the publication of Lacordaire's volume dealing with the *Lamellicornes* numerous Australian genera have been added, and as their diagnoses are scattered over a wide field of literature it seems desirable before passing to the description of some new species that are before me to make some remarks on the aggregates to which those new species are referable. I will begin with the

SERICIDES (sub-tribe).

Excluding *Mœchidius* and including *Pachytricha* and *Phœnognatha* (as proposed above), four genera known to Lacordaire would form the Australian contingent of this sub-tribe. To these five genera must now be added (including two new ones described below and one formerly described under a nom. præocc).

A. Head (at any rate of the male) armed with a horn ... ... *Phœnognatha.*
AA. Head unarmed.
B. Each claw bidentate beneath ... ... *Pachytricha.*
BB. Claws not bidentate beneath.

C. Hind coxæ elongate.
  D. Hind tarsi with claws elongate slender and simple.
    E. Basal four joints of front tarsi of male together much longer than apical process of tibia.
      F. Intermediate claws similar to hind claws ... ... *Phyllotocus.*
      FF. Intermediate claws short (in male thickened and with long appendages) ... ... *Phyllotocidium*, gen. n.
    EE. Basal four joints of front tarsi together shorter than apical process of tibia ... ... *Cheirrhamphica*, gen. n.
  DD. Hind tarsi with short claws.
    E. These claws simple ... ... *Neophyllotocus*, gen. n.
    EE. These claws appendiculate ... *Cheiragra.*
CC. Hind coxæ short and parallel.
  D. Eyes free or nearly so ... ... *Diphucephala.*
  DD. Front part of eyes divided by a canthus ... ... *Epholcis.*

PHYLLOTOCUS.

Many of the species of this genus are incapable of certain identification where comparison of types is not feasible. Unfortunately 30 names are attributed to it. In Trans. Ent. Soc. N.S.W., I., pp. 80 &c., the late Sir W. Macleay published a review of the then existing names and added nine more, but although he complained of the imperfection of Boisduval's descriptions his own descriptions were of the same kind as Boisduval's,—one of them consisting of eight words of Latin and 13 of English in which no definite character is mentioned apart from color, and the rest are not much better. I have had the advantage of examining some of Sir W. Macleay's types and therefore am in a position to attempt a contribution towards the elucidation of the genus. In Trans. Ent. Soc., N.S.W., II., p. 187, Sir W. Macleay described two additional species, and in P.L.S., N.S.W., 1887, p. 225, another.

Although most of Boisduval's descriptions are in my opinion incapable of being definitely attributed to any particular species it seems to me desirable, as Sir W. Macleay has applied them to species in his collection, to accept his identifications and to let the insects in question bear Boisduval's names. These names are *præusta*, *rufipennis*, *australis*, and *mœstus*. The first of them (*præusta*) Sir W. Macleay regards (correctly I think) as a synonym of *Macleayi*, Fischer, which last is a species that can be confidently identified. Boisduval described another species (*Lottini*) which he referred to *Phyllotocus* only with doubt and which Sir W. Macleay believed to be a *Liparetrus;* it certainly may be disregarded.

Erichson described one species (*P. bimaculatus*); it is easily recognisable.

Blanchard followed with three species (*erythropterus*, *navicularis* and *ustulatus*); all are easy to identify.

Burmeister was the next describer, and he also added two names (*discoidalis* and *pectoralis*) the former of which he gives as Mr. W. S. Macleay's name (no doubt MS.) and states that it is identical with *australis*, Boisd. It seems to me decidedly that it is a variety of the species that Sir W. Macleay has called *australis*, Boisd., and that the insect which Sir W. Macleay subsequently named *iridescens* is the same thing. *Pectoralis* (as Sir W. Macleay points out) is not a *Phyllotocus*.

In 1858 Bohemann described three species (*marginicollis*, *oblongus* and *velutinus*) which Sir W. Macleay says (I think correctly) are all founded on varieties of the species that he calls *mœstus*, Boisd.

Then Sir W. Macleay follows with his 12 names on which I make the following remarks.

Assimilis is excessively close to *Macleayi*, Fisch. Its author states that the only good specific character to separate it by is a slight groove on its forehead. After examining a long series I have failed to find such a groove constantly present or absent in either species, and doubt whether the two are distinct.

Kingi is undoubtedly a good and distinct species. I believe it to be the insect which Boisd. called *rufipennis*, but as Sir W. Macleay has attributed that name to another insect I shall not disturb his nomenclature.

Marginipennis has puzzled me considerably. Its author states that it is abundant in the neighbourhood of Sydney; yet I have seen nothing among the numerous *Phyllotoci* collected by me (or sent to me from) near Sydney which agrees with the description. Unfortunately I can find no reference to it in the notes I made when examining Sir W. Macleay's types,—so I must pass it by with the remark that unless there is some clerical or printer's error in the description it is probably a good species unknown to me.

Iridescens (as noted above) I have little doubt is identical with *australis*, Boisd.

Palliatus is decidedly a var. (not I think sexual, as Sir W. Macleay conjectures) of *discoidalis*.

Marginatus its author conjectures to be the female of *marginipennis*. Judging by the description I have no doubt it is a form of that species, though I doubt the difference being sexual.

Ruficollis I cannot identify confidently. The colours are differently described in the Latin diagnosis and the English

following it. It is possible that the species I call *ruficollis* in the following tabulation may be wrongly identified.

Scutellaris is a good species.

Apicalis (from Northern Queensland) is a good species.

Sericeus, its author states, resembles *australis*, Boisd.; but no difference from that species is pointed out, and the description applies perfectly to the species named *australis* in the Macleay collection. I have not seen the type of *sericeus*, which is not in the Macleay Museum, but is doubtless in the "Australian" Museum.

Variicollis I think I know; the type specimen is no doubt with that of *sericeus*, and I have not seen it, but I have an example from the neighbourhood where *variicollis* was taken, which agrees well with the description. It seems to be a good species.

Vittatus is an extremely isolated species from tropical Queensland.

The remaining three species *(occidentalis, Meyricki,* and *dispar)* are of my own nomenclature.

It will thus be seen that after all necessary weeding out eighteen species remain which may be regarded as at present forming the genus *Phyllotocus*. The following tabulation shows satisfactory structural characters for distinguishing most of the described species. There are however two *(apicalis*, Macl. and *marginipennis*, Macl.) which I am unable to place in the tabulation owing to the vagueness of their descriptions.

A. Elytra glabrous (or nearly so) except along their lateral margins.
  B. Elytra nitid, not velvety, with interstices similar *inter se* and not (or scarcely) convex.
    C. Maxillary palpi elongate, their apical joint narrow and cylindric or nearly so.
      D. Front tibiæ in both sexes externally tridentate (including the apical process).
        E. Prothorax rectangular at base ... *Macleayi*, Fisch.
        EE. Hind angles of prothorax strongly obtuse... ... ... *bimaculatus*, Er.
      DD. Front tibiæ with only one tooth above the apical projection.
        E. Head testaceous ... ... *occidentalis*, Blackb.
        EE. Head black ... ... *Meyricki*, Blackb.
    CC. Maxillary palpi much shorter, their apical joint somewhat oval ... ... *mœstus*, Boisd.
  BB. Elytra more or less opaque, often velvety, with convex unequal interstices.
    C. Hind femora black or nearly so.
      D. Prothorax strongly lobed in the middle of base ... ... *scutellaris*, Macl.
      DD. Prothorax not (or scarcely) lobed in middle of base.
        E. Puncturation of prothorax faint and obscure (as usual in the genus) .. *ustulatus*, Blanch.

EE. Puncturation of prothorax unusually strong and well defined... ... *variicollis*, Macl.
CC. Hind femora testaceous ... ... *vittatus*, Macl.
AA. Elytra clothed with erect hairs (at any rate along the base and suture).
B. The hairs fringing the prothorax black or nearly so.
C. Prothorax entirely black.
D. Head very coarsely unevenly and by no means closely punctulate.
E. Convexity of prothorax (viewed from side) even,—at any rate in the middle.
F. Elytra entirely set with erect pilosity *erythropterus*, Blanch.
FF. Disc of elytra glabrous ... *rufipennis*, Boisd.
EE. Prothorax strongly declivous hindward all across base ... ... *Kingi*, Macl.
DD. Head closely evenly and somewhat finely punctulate ... ... *navicularis*, Blanch.
CC. Prothorax red, or at any rate with its sides broadly red.
D. Prothorax very strongly lobed hindward at middle of base ... ... *ruficollis*, Macl.
DD. Prothorax not or but little lobed at base *australis*, Boisd.
BB. The prothorax fringed laterally with close-set white pilosity ... . *dispar*, Blackb.

It seems desirable to say a word regarding the sexual characters of *Phyllotocus*, which to some extent vary with the species. In all of them the male has one of the claws of its front tarsi more or less (in some species very much more than in others) dilated. There is also a tendency towards darker coloring in the males than in the females of some species, and in several species the elytra of the female are much more hairy than those of the male. This latter character is very noticeable in *P. australis*, Boisd.; but is extremely developed in *P. Kingi*, Macl., the female of which has its elytra densely set with velvety pile while in the male the elytra are nearly glabrous on the disc. Sir W. Macleay is certainly justified, I think, in regarding Lacordaire as in error when he finds sexual characters in the antennæ of *Phyllotocus*. I do not observe any sexual differences in the armature of the front tibiæ.

PHYLLOTOCIDIUM (gen. nov. *Sericidarum*).

Mentum sat elongatum sat angustum; palpi labiales breves, articulo ultimo obconico; palpi maxillares sat breves (fere ut Cheiragræ), articulo apicali elongato-ovali quam ceteri conjuncti vix breviori; labrum breviter transversum (a *Cheirrhamphicæ* parum dissimile); oculi modici; antennæ modicæ, 8-articulatæ, clava (maris quam feminæ magis elongata) 3-articulata; prothorax æqualis; scutellum modicum; elytra maris haud, feminæ vix manifeste, striata; pedes robusti minus elongati; tibiæ anticæ extus (processu

apicali vix extus directo excepto) haud dentatæ ; unguiculi modice elongati (ab articulo 5° tarsorum longitudine haud multo dissimiles), simplices, maris anterioribus incrassatis et appendicibus 2 elongatis membranaceis instructis ; coxæ posticæ quam metasternum paullo breviores ; corpus supra sat glabrum, subtus pilosum.

Type *P. (Cheiragra), Macleayi*, Blackb.

The tarsal character of this species (mentioned by me in describing it, P.L.S., N.S.W., 1891, p. 482) must, I am now convinced, be regarded as inconsistent with a place in the genus *Cheiragra ;* its facies moreover is quite *sui generis*, the glabrous nitid upper surface being suggestive of certain *Phyllotoci* while its head is that of a *Cheiragra ;* the structure of the legs (and especially the claws) is quite different from that of any other species known to me, while the coppery (or purplish) gloss of the upper surface distinguishes it among its allies.

CHEIRRHAMPHICA (gen. nov. *Sericidarum).*

Mentum sat elongatum sat angustum ; palpi labiales breves, articulo ultimo obconico ; palpi maxillares modici (quam *Phyllotoci Macleayi*, Fischer, multo breviores), articulo ultimo subcylindrico ad apicem subacuminato ; labrum breve transversum a clypeo sutura vix manifesta divisum ; oculi modici, fere ut *Phyllotoci ;* antennæ modicæ, 8-articulatæ, clava brevi 3-articulata ; prothorax æqualis ; scutellum modicum ; elytra oblonga, parum manifeste striata ; pedes elongati fere ut *Phyllotoci*, sed maris tibiis anticis compresso-dilatatis et tarsis anticis brevibus (harum articulis basalibus 4 brevissimis, articulo apicali quam tibia antica vix breviori, unguiculo permagno deformi) ; coxæ posticæ quam abdomen vix breviores ; corpus pubescens.

It will be seen from the above diagnosis that this genus must be placed in Lacordaire's "Groupe" *Phyllotocides* and that it differs from *Phyllotocus* notably in the front piece of the clypeus being very short, strongly transverse, and not separated from the preceding piece by a sharply defined suture, also by the very remarkable sexual characters in the front legs of the male, and the very different maxillary palpi. The hind coxæ are very elongate, their hind edge being (on the lateral margin) scarcely farther from the apex of the abdomen than from the hind margin of the metasternum.

C. pubescens, sp. nov. Sat ovalis ; pube pallida sat elongata adpressa vestita ; subnitida ; nigra, vix ænea, antennis palpis pedibusque brunneo-testaceis (nonnullorum exemplorum prothorace elytris abdomineque brunneo-testaceis, nonnullorum

femoribus posticis vel 4 posterioribus infuscatis); capite prothoraceque sparsim sat fortiter, elytris minus sparsim minus fortiter, pygidio leviter squamose, punctulatis; prothorace transverso, antice leviter angustato minus emarginato, lateribus sat arcuatis, basi bisinuata, angulis posticis obtusis; scutello modico; elytris haud (vel vix manifeste) striatis; tibiis anticis extus bidentatis. Long., $1\frac{3}{4}$—$2\frac{1}{2}$ l.; lat. $\frac{4}{5}$—$1\frac{1}{5}$ l.

In the male the basal four joints of the front tarsi are incrassated and very short,—together scarcely reaching to the apex of the apical process of the tibia. The fifth joint is excessively dilated and as long (without including the claws) as the preceding joints together. One claw is as long as the fifth joint has a very large lamina like appendage at its base and is attached to the apex of the fifth joint in such fashion that it is directed backwards almost parallel with the tarsus. The other claw is normal. The apex of the basal part of the fifth joint is thickly clothed with long hairs.

W. Australia; taken by Mr. Lea at Swan River and Geraldton.

C. interstitialis, sp. nov. Mas.—Ovalis; parum lata; pube brevi erecta pallide ferruginea vestita; sat opaca; nigra, antennis palpis pedibus anterioribus 4 tarsisque posticis plus minusve rufescentibus; capite crebrius subtilius, prothorace sparsim sat grosse, elytris quam prothorax magis crebre vix minus grosse, pygidio minus perspicue, punctulatis; prothorace vix transverso, antice sat fortiter angustato, lateribus modice arcuatis, basi vix bisinuata, angulis posticis obtusis; scutello modico; elytris costis obsoletis angustis circiter 4 instructis; tibiis anticis extus haud (processu apicali excepto) dentatis; tibiis posticis robustis. Long. $2\frac{1}{3}$ l; Lat. $1\frac{1}{5}$ l.

I see no reason to separate this species generically from the preceeding although as will be seen by comparing the descriptions the two are not much like each other superficially. The erect (not adpressed) hairs with which it is clothed, its clypeus more evenly rounded in front, its much less transverse prothorax its elytra with distinct traces of costæ, its very stout hind tibiæ, the much more numerous setæ at the apex of each tarsal joint, &c., contribute to make this species extremely distinct from the preceding. Its facies, indeed, is very much that of a *Cheiragra*, but I do not see how it can justifiably be placed among species with short appendiculate claws while (as is the case) its claws are altogether as characterized in the diagnosis of *Cheirrhamphica*. Perhaps eventually it may be regarded as the type of a new

genus. The male characters of the front tarsi are quite as in *C. pubescens* except in the basal lamina of the large claw being scarcely developed.

N. Queensland ; sent by Mr. French.

NEOPHYLLOTOCUS (gen. nov. *Sericidarum*).

Type *N.* (*Macrothops*) *rostrata*, Macl.

I propose this name as a substitute for *Macrothops*, Macl. nec Boisd., which is a nom. præocc., having been used by Boisduval for a genus already named *Phyllotocus* by Fischer de Waldh. Sir W. Macleay's diagnosis is not very complete as it does not include any reference to the claws, where the most obvious distinctive characters of the *Phyllotocides* are to be found. In the present genus the claws are extremely short (about half the length of the 5th tarsal joint), and are all simple in the female. In the male one of the claws on each of the 4 anterior tarsi is bifid.

Sir W. Macleay described a second species of his genus *Macrothops* under the name *pallidipennis* which he stated was founded on specimens that had lost their "palpi, tarsi &c." It is therefore, impossible to say whether that species is rightly associated with the present insect.

CHEIRAGRA.

Sir W. Macleay formed this genus for a number of species which he described so briefly that it is impossible to identify any of them (as species) with certainty except by comparison, which has not been practicable for me.

I have before me a considerable number of specimens evidently attributable to the genus. Sir W. Macleay in his diagnosis of the genus omitted to mention that the claws are appendiculate and furnished at their base with large membranous processes, which I take to be the most reliable generic character. In the male the front tarsi have one claw similar to those of the female while the other claw is enormously developed and turned back against the surface of the tarsus.

With the exception of two examples (from a far Northern locality, unfortunately both females and therefore undesirable for description) I cannot satisfy myself that the specimens of this genus before me represent more than one species. They are from various localities in Victoria and N.S. Wales and differ to a remarkable extent in coloring, so that it is hard to find two quite alike. This species does not appear to be *Phyllotocus pusillus*, Blanch. (which Sir William seems to regard as the type of *Cheiragra*) as its prothorax is not black in any variety that I have seen and certainly could not be described as "haud punctatus."

I suspect it is *C. ruficollis*, Macl., but unfortunately there is a discrepancy between the 12 words of Latin and the 33 of English of which the description consists, as the Latin makes the elytra testaceous and the English implies that they are black (at least in the male). However, the specimens before me include elytra entirely black, entirely testaceous, and black with various testaceous blotches. There are no differences among Sir W. Macleay's descriptions of *C. ruficollis*, *pallida*, *lurida*, and *atra* except in respect of color and slight distinctions in size. *C. pygmæa* is probably a distinct species which I have not seen, and *aphodioides* may be distinct, as Sir W. Macleay says that the front tibiæ of the male are more slender than in its allies.

EPHOLCIS.

This genus bearing much superficial resemblance to *Mœchidius* has entirely the *Sericid* relation between clypeus and labrum. Mr. C. O. Waterhouse in founding it expressed the opinion that it is intermediate between *Diphucephala* and *Mœchidius*. Its coloring and the character of its sculpture as well as the presence of appendages at the base of the claws are certainly suggestive of the latter, though it is to be noted that the claw appendages are not really characteristic of *Mœchidius*, being absent in many species, and an analogous structure being found in an isolated species (*Nosphisthis*) described below. But the structure of the head is totally different from that of *Mœchidius* and if it were to be regarded as allied to that genus rather than *Diphucephala* it would upset the validity of *Sericides* and *Sericoides* as distinct sub-tribes. I have little doubt that it is a flower-frequenting genus. *Mœchidius Albertisi* and *bilobiceps* of Fairemaire are evidently referable to *Epholcis*. I suspect that the former is identical with *E. divergens*, Waterh., in which case its name must sink as a synonyn.

I refer provisionally to this genus *Mœchidius gracilis*, Waterh. which its author says is "very unlike all the others in that genus." It appears to me impossible to consider it a *Mœchidius* or even closely allied thereto, inasmuch as its prosternal sutures are not open to receive its antennæ and its mouth structure is of the *Sericid* type, the front of its labium being almost in contact with the apex of the clypeus without the intervention of a visible labrum. Its facies is undoubtedly highly suggestive of *Mœchidius* and very different from that of *Epholcis*, but nevertheless I can find no character to separate it from the latter genus which is not evidently merely specific in other genera, e.g. *Diphucephala* and *Mœchidius*. The following is a new species allied to *E. (Mœchidius) gracilis*.

E. longior, sp. nov. Sat elongata ; sat opaca ; picea, antennis palpis pedibus et corpore subtus rufescentibus ; setulis brevibus gracilibus adpressis, et pilis erectis elongatis sparsis, testaceis vestita ; capite antice truncato elevato-reflexo, lateribus sinuatis ; prothorace sat transverso, antice fortiter angustato crebre rugulose sat grosse punctulato, lateribus fortiter rotundatis, angulis anticis sub-acutis minus prominulis posticis rotundato-obtusis, basi rotundata; elytris obscure seriatim punctulatis, lineis 3 obscurioribus vix elevatis instructis ; tibiis anticis extus 3-dentatis (dentibus inferioribus 2 approximatis, a 3° sat remotis) ; tarsorum posticorum articulo basali quam 2us multo longiori ; unguiculis singulis ad basin appendiculis singulis armatis. Long. $3\frac{1}{2}$l. ; Lat. $1\frac{3}{5}$l.

Larger and more elongate than *E. gracilis*, Waterh., with the prothorax much more coarsely punctulate ; the clypeus considerably more reflexed in front (causing the labium to appear less nearly in contact with the edge of the clypeus when the head is looked at from beneath), and with its sides more sinuate.

N. Queensland ; sent by Mr. Cowley.

SERICOIDES (Sub-tribe).

This sub-tribe is by far the most numerously represented among the Australian *Melolonthini*, and moreover presents extraordinary difficulties in classification, owing to the presence of the most remarkable structural differences between insects that apart from those differences are not even very notably distinct from each other as species. These differences are found in the number of joints in the antennæ, the structure of the antennal club, the form of the labrum and the hind coxæ, and even, to some extent, the structure of the claws. To regard such differences as generic (which one would do unhesitatingly in the case of almost any other *Coleoptera*) would require an enormous multiplication of the genera known at present and would split up numerous genera that are among the most natural aggregates in the whole coleopterous series. For example, to regard those differences as generic would involve the formation of at least nine new genera out of *Heteronyx*, than which in a natural arrangement a more homogeneous aggregate could hardly be found, and changes almost as sweeping would be required in nearly all the other large genera.

However at present the sub-tribe is in a state of extreme confusion. Numerous genera have been formed since the publication of Lacordaire's work, but their diagnoses are scattered over a wide field of literature and so far as I know have not been systematically classified. The result of this is that anyone having new species to describe is faced with the greatest difficulty in

ascertaining the genus to which (at least some of them, in all probability) should be referred. I propose therefore, before proceeding to describe various new species before me, to review the *Sericoid* genera and endeavour to set forth their characters in a tabulated form. I shall not, however, attempt the ambitious task of placing the genera in anything like a permanently satisfactory condition, as in my opinion that would be at present impossible, and moreover would require very extensive alterations that should be made by someone who has a wider knowledge than I possess of the *Sericoides* of other parts of the world.

I may say, in passing, that I believe the character which should have the greatest weight in the classification of the Sericoid species into genera to be the nature of the sexual distinctions. There are far too many species of which the sexual characters are at least uncertain to allow of this system being carried out to-day, but I am convinced that in it will be found the key to the essential distinctions among the Sericoid genera.

What I shall attempt will be simply to determine which of the existing generic names can be retained as founded on characters that are (at any rate among other characters) valid, and show the relation of them to each other,—making as few additions as possible, and not attempting to split them up even in cases where I have little doubt that a fuller knowledge of the sexes will eventually require that they be split up. It is necessary however to add a few new genera.

It will be observed that in the following classification of genera considerable weight is conceded to characters seeming very slight in comparison of others which are treated as of little value though apparently more important; as where the nature of the elytral striation is made generic and the number of antennal joints specific. On this I have to remark that in what I believe will be the really scientific classification characters founded on the nature of the sexual distinctions will take the place of the apparently unimportant characters now employed and also that, however superficial some of these make-shift characters may appear, long and careful observation of a very extensive series of species from many collections has convinced me that they accompany real generic difference and that there is no fear of future observations requiring the genera thus slightly characterized to be suppressed, but that the effect of future observations will be only to show the necessity of further sub-division of the genera now distinguished by apparently slight characters.

The following may be noted in respect of the result of my observations regarding the Australian *Sericoides*. 1. The nature of the armature of the claws where the claws are not simple cannot be relied upon as generic, but the difference between claws

that are either bifid or appendiculate and those that are simple (disregarding membranous basal appendages) is strictly generic. 2. The number of antennal joints and the number of joints forming the antennal club are not generic (although the difference between the number of joints in the club where it is sexual probably *is* generic). 3. Characters founded upon the granulation of the eyes are strictly generic. 4. The difference between simple and geminate striation of the elytra is nearly always combined with reliable generic differences. 5. Marked differences in the form of the clypeus (at least in many cases) are much more generic than differences in the form of the labrum. 6. Differences in the hind tibiæ are generic.

From these general observations I now pass to some remarks on the generic names that at present stand attributable to the Australian *Sericoides*. These are, I believe, 34 in number (excluding "*Melolontha*" which seems to have been applied loosely by some of the earlier authors to species of this subtribe). Of these *Cotidia* and *Colobostoma* are mere names given (without mention of characters) by Boisduval to species that cannot be identified. It is not unlikely that *Colobostoma* was founded on the insect since named *Platydesmus sulcipennis* by Sir W. Macleay, but the evidence is not strong enough to upset the later name. I have already discussed this point in Proc. Linn. Soc., N.S.W., 1890, p. 517 (note).

Haplonycha = *Colpochila*. *Silopa* and *Hostilina* = *Heteronyx*. *Philochlœnia* and *Omaloplia* = *Caulobius*. Of the names sunk as synonyms in the above statement I regard it as possible that two (*Haplonycha* and *Philochlœnia*) may have to be restored as representing valid genera when the sexual characters of *Colpochila* and *Caulobius* are known in a long range of species, but I do not find any other generic character that seems sufficient to confirm them.

After the above eliminations there remain 28 genera, to the validity of which I am not able to bring any definite objection, but of them there are four that I have not been able to identify among the large collections of *Melolonthini* that I have examined. On each of these a few remarks seem called for.

1. *Automolus*. This genus was formed by Burmeister for a small Tasmanian species, to which Erichson seems to have attached the MS. name *Liparetrus angustulus*. Burmeister says that its antennæ are nine-jointed. Assuming the correctness of that statement I should say that the genus is a good one and that I have not seen it. If it could be that Burmeister had counted the joints incorrectly and that they are really eight (it is easy to go wrong about the minute antennal joints of a small *Liparetrus*) I should suspect that the species is one of those which Sir W.

Macleay calls "Section II" of *Liparetrus*, and in that case I am not at all sure that it would not be justifiable to retain the name *Automolus* and regard Macleay's "Section II" as forming a distinct genus. But in this uncertainty I must pass the genus by with the remark that it is certainly very closely allied to *Liparetrus*.

2. *Microthopus*. This is another genus (from W. Australia) which Burmeister characterises as closely allied to *Liparetrus*. If its author is right in saying that it is founded on a male example it is unknown to me. If he was mistaken about its sex I should regard it as possibly identical with my genus *Macleayia* (in which case my name would lapse). Here again I must pass the genus by as uncertain.

3. *Homolotropus*. This genus was founded by Sir W. Macleay (Tr. Ent. Soc., N.S.W., II., p. 193) on an insect that I am unable to identify. Apart from the antennæ I find no character in the diagnosis that seems really generic, and the antennal characters alone do not appear to me conclusive. Nevertheless, from the description of the species, I take it that the genus is likely to be a good one, but there is no character mentioned by the author that enables me to place it in a tabulation. Moreover as Sir W. Macleay asserts that the position of *Homolotropus* is near *Xylonychus* (which Lacordaire places among the true *Melolonthides*, where I think it is certainly more at home than in the *Sericoides*) it is quite possibly not a member of the *sericoid* group.

4. *Odontonyx*. Another of Sir W. Macleay's genera concerning which I cannot speak positively. The diagnosis would fit *Eurychelus* but in the description of the *species* the author states that there "seems to be" a kind of membranous appendage beneath the last joint of the tarsi, and this remark I am afraid compels me to pass the genus by, with the observation that it is probably near *Eurychelus*.

To the above I have to add nine new genera bringing up the total number to 33.

A. Prosternal sutures normal.
  B. The claws simple (disregarding membranous appendages).
    C. Winged species.
      D. Femora glabrous and very slender and elongate ... ... *Telura*.
      DD. Femora shorter and stouter and more or less pilose.
        E. Elytra very short exposing much of the propygidium (all small species).
          F. Clypeus margined in front.
            G. Antennal club 3-jointed in both sexes ... *Liparetrus*.
            GG. Antennal club 5-jointed in the male ... *Macleayia*.
          FF. Clypeus not margined in front ... ... *Comophorus*.
        EE. Elytra of normal length (except in a very few large species).

F. Eyes large (projecting laterally at least as far as clypeus), nitid, and scarcely (or very finely) granulate.
G. Front tibiæ not as in GG.
H. Antennal club not setose on the faces of the joints in either sex.
I. Tarsal joints not bearing tufts of long soft hairs.
J. Labrum distinct (at least by a suture) from vertical front face of clypeus.
K. Free outline of clypeus an even curve (or nearly so)
L. Base of prothorax margined.
M. Elytra geminate-striate.
N. Hind tibiæ short, their inner outline not nearly straight.
O. Apical joint of labial palpi conic, not much longer than penultimate ... *Aneucomides.*
OO. Apical joint of labial palpi longer and more cylindric.
P. Labrum (viewed from above) truncate or emarginate in front.
Q. Canthus cutting into front of eye well defined... ... ... *Colpochila.*
QQ. Front of eye entire (or all but entire) ... ... *Petinopus.*
PP. Labrum strongly projecting, reflexed and angular at apex ... *Glossocheilifer.*
NN. Hind tibiæ more elongate, their inner margin straight.
O. Antennal club differing sexually (always longer than apical joint of maxillary palpi) ... ... *Scitala.*
OO. Antennal club in both sexes not or scarcely longer than apical joint of maxillary palpi ... ... *Anodontonyx.*
MM. Elytra not geminate-striate.
N. A membranous appendage at the base of each claw .. .. *Nosphisthis.*
NN. No membranous appendage at base of claws.
O. Eyes widely separated.
P. Spurs of hind tibiæ normal.
Q. Apical joint of labial palpi elongate and cylindric... ... ... *Frenchella.*
QQ. Apical joint of labial palpi short and more or less conic ... *Platydesmus.*
PP. Hind tibiæ without spurs distinct from the fringing cilia ... *Anacanthopus.*
OO. Eyes very large, subapproximate above and beneath the head ... *Engyops.*
LL. Base of prothorax not margined.
M. Transverse carina of hind tibiæ wanting (as in *Scitala*).
N. Sterna clothed with long pilosity ... *Colpochilodes.*
NN. Sterna almost glabrous ... *Sericesthis.*
MM. Transverse carina of hind tibiæ well defined (as in *Colpochila*) ... *Neso.*

K.K. Front of clypeus with sharp lateral angles, its sides straight... ... *Sciton*
K.K.K. Front of clypeus emarginate ... *Byrrhomorpha.*
J.J. Labrum entirely confused with vertical front face of clypeus ... ... *Dysphanocheila.*
I.I. Tarsal joints each with an isolated tuft of long soft hairs beneath ... ... *Ocnodus*
H.H. The faces of the joints of the antennal club clothed with erect setæ ... ... *Diphyllocera.*
G G. Front tibiæ excessively dilated and sinuous (not dentate) externally ... ... *Pachygastra.*
F.F. Eyes smaller, and more distinctly granulate; surpassed by clypeus.
G. Front tibiæ not having a tooth close to the base externally ... ... *Haplopsis.*
G.G. Front tibiæ with a minute tooth close to the base externally ... ... *Caulobius.*
C.C. Apterous species ... ... *Callabonica.*
B.B. Claws bifid or appendiculate.
C. Apterous species ... ... *Pseudoheteronyx.*
C.C. Winged species.
D. Antennæ with more than 7 joints.
E. Tarsi of male normal.
F. Form strongly depressed ... ... *Eurychelus.*
F.F. Form notably more convex ... ... *Heteronyx.*
E.E. Anterior four tarsi of male strongly dilated... *Neoheteronyx.*
D.D. Antennæ with only 7 joints ... .. *Nepytis.*
A.A. Prosternal sutures open to receive the antennæ ... *Mœchidius.*

ANEUCOMIDES (gen. nov. *Sericoidarum*).

Mentum antice emarginatum; palpi labiales breves, articulo ultimo breviter conico quam præcedens parum longiori; palpi maxillares sat elongati, articulo ultimo quam præcedens sat longiori; labrum modice exstans, antice late rotundatum (superne visum); oculi sat magni nitidi vix manifeste granulati, antice a cantho profunde incisi; antennæ (speciei typicæ) 9-articulatæ, clava 4-articulata (hac maris quam articuli præcedentes conjuncti parum breviori, feminæ haud observatæ); prothorax transversus; elytra geminato-striata; tibiæ anticæ extus 3-dentatæ, posticis perbrevibus ad apicem valde dilatatis; unguiculi simplices; sterna femoraque pilosa.

The species for which I propose this new generic name is an extremely puzzling one. Its facies is strongly suggestive of a small *Dynastid* of the *Oryctomorphid* group, but its abdominal stigmata are decidedly those of a *Melolonthid*, its antennal structure moreover being quite inconsistent with the idea of a *Dynastid*. It is a short robust insect with hind femora and tibiæ very short and incrassate, and bears no resemblance in facies to any other *Melolonthid* known to me. Nevertheless, I have failed to discover any structural character that I can rely upon to dis-

tinguish it from *Colpochila* except the conic form and unusual brevity of the apical joint of the labial palpi and the somewhat peculiar labrum (slightly approaching that of *Glossocheilifer*), which viewed from above appears as a lamina projecting to a moderate degree from the lower part of the vertical front face of the clypeus, and having its free outline broadly rounded. In the unique male before me the abdomen is remarkably short but this may possibly be the result of distortion merely, and I also observe that the bristles forming the apical fringe of the hind tibiæ are unusually short and thick.

A. coloratus, sp. nov. Brevis, sat latus; sat nitidus; supra sat glaber sed prothorace pilis fimbriato, subtus in sternis femoribusque pilosus; rufus, elytris nigro-piceis; clypeo subtilius crebrius, capite postice magis fortiter, prothorace ut clypeus sed minus crebre, elytris crebrius fortiter, pygidio subtiliter sparsim, punctulatis; clypeo antice rotundato sat fortiter reflexo; prothorace postice marginato, fortiter transverso, antice fortiter angustato, angulis anticis acutis minus prominulis posticis (superne visis) fere rectis, basi utrinque vix sinuata; elytris parum distincte striatis (striis geminatis), interstitiis planis; tarsorum posticorum articulo basali quam 2us vix breviori. Long., 5 l.; lat., $2\frac{4}{5}$ l.

This small species is notable for its coloring, the whole insect being of a somewhat full red color except the elytra which are black (or nearly so), with a little tendency to rufescence about the shoulders.

S.W. Australia; Eyre's Sand Patch.

COLPOCHILA.

C. Roei, Burm., is certainly, I think, identical with *C. crassiventris*, Blanch. The latter is the older name.

PETINOPUS (gen. nov. *Sericoidarum*).

Mentum antice profunde triangulariter emarginatum; palpi labiales modici, articulo ultimo gracili cylindrico; palpi maxillares sat elongati, articulo ultimo quam præcedens multo longiori; labrum a clypei parte antica verticali bene discretum sed vix prominulum (fere ut *Scitalæ*); oculi magni nitidi vix manifeste granulati, antice fere integri; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata quam palporum maxillarium articulus ultimus parum longiori (maris quam feminæ haud longiori); prothorax transversus; elytra geminato-striata; tibiæ anticæ extus 3-dentatæ, posticis modicis latis intus sat fortiter arcuatis; unguiculi simplices; sterna parce pilosa; tarsi posteriores 4 maris subtus longe dense pilosi.

The species for which I propose this new generic name has the appearance of a *Colpochila*,—though very much smaller than any *Colpochila* known to me,—but is at once distinguishable from the species of allied genera by the sides of its clypeus not cutting into the eye. I find however a faintly marked smooth but scarcely elevated line on the eye occupying the position that in allied genera is occupied by the canthus-like prolongation of the clypeus. Another notable character consists in the long closely placed pilosity on the underside of the hind and intermediate tarsi in the male which gives those organs an appearance from a certain point of view suggestive of a feather. In the female the hind tarsi are glabrous except at the apex of each joint. The mentum, moreover, is remarkable on account of the very deep triangular excision (reaching nearly half-way to the base) of its apical margin.

P. ægrotus, sp. nov. Sat brevis; sat latus; sat nitidus; supra fere glaber; brunneo-testaceus; clypeo minus crebre, capite postice crebre subaspere, prothorace vix crebre minus fortiter, scutello fere ut prothorax, elytris fortius subcrebre, pygidio fere ut prothorax, punctulatis; clypeo antice rotundato reflexo; prothorace quam longiori duplo latiori, antice minus angustato, angulis anticis sat acutis parum productis posticis rotundato-obtusis; scutello magno triangulari; elytris leviter geminato-striatis, interstitiis nonnullis angustis subconvexis; tarsorum posticorum articulis 1—4 inter se longitudine subæqualibus. Long., $4\frac{1}{4}$ l.; lat., $2\frac{1}{5}$ l.

N. Territory of S. Australia; in my collection, also in S.A. Museum.

GLOSSOCHEILIFER (gen. nov. *Sericoidarum*).

Mentum antice latum fortiter emarginatum; palpi fere ut *Diphyllocerœ* (labialibus modicis articulo ultimo sat elongato apicem versus angustato, maxillaribus sat elongatis articulo ultimo quam præcedens sat longiori); labrum fortiter productum, ad apicem angustatum et reflexum; oculi sat magni, sat nitidi, fere læves, antice a cantho profunde incisi; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata hac maris articulis antennarum 2-6 conjunctis æquilonga, feminæ sat breviori; prothorax transversus; elytra geminato-striata; tibiæ anticæ extus 3-dentatæ, posticis minus elongatis (parte apicali sat fortiter dilatata); unguiculi simplices; sterna pilis elongatis dense vestita; tarsis maris quam feminæ multo longioribus robustioribus.

This genus differs from all its allies in the remarkable form of its labrum, which is very large and projects forward from the lower extremity of the front (subvertical) face of the clypeus,

bending obliquely upward, and viewed from above looks like a protruding tongue.

G. labialis, sp, nov. Elongato-ovatus; nitidus; supra fere glaber, subtus in sternis femoribusque pilosus; piceo-niger, antennis palpisque rufis, pedibus (præsertim coxis anticis) plus minusve rufescentibus; clypeo minus crebre, capite postice confertim (hoc exemplorum visorum in medio fovea leviter impresso), prothorace sparsim (ad latera magis crebre), elytris sat sparsim, parum fortiter punctulatis; pygidio in medio sublævi, ad latera sparsius subtiliter punctulato; clypeo antice rotundato sat reflexo; prothorace postice marginato, sat transverso, lateribus sat fortiter arcuatis, angulis anticis acutis minus productis posticis rotundato-obtusis, basi utrinque sinuata; elytris in disco distincte striatis (sed striis minus perspicue geminatis), latera versus minus distincte striatis (sed striis perspicue geminatis); tarsorum posticorum articulo basali quam 2us sat breviori. Long. $6\frac{1}{2}$—7l.; lat. $3\frac{4}{5}$l.

W. Australia; taken by Mr. Lea at Mt. Barker.

SCITALA.

In Proc. Linn. Soc., N.S.W., 1890, pp. 539-545, I wrote at some length on the claims of this name to retention,—it having been substituted by Burmeister and Lacordaire for *Sericesthis*. I need not now repeat the arguments I then employed, but merely observe that I contended for the claims of *Sericesthis* to be retained in preference to *Scitala*. In doing so I followed the distinguished authors quoted above in the assumption that the type of *Sericesthis* is congeneric with the type of *Scitala*. Lately however I have seen reason to consider that assumption unwarranted. I take it that the type of *Sericesthis* is the species for which Boisduval first used the name,—viz. ***S. geminata***,—and that is undoubtedly a later name for *Melolontha pruinosa*, Dalm. Now the type of Erichson's genus *Scitala* is ***S. sericans***, Er., a species which I am not sure that I know, but I have before me numerous species undoubtedly congeneric with it (judging by the generic diagnosis), and there appear to me sufficient reasons for the conclusion that they are not congeneric with *Sericesthis geminata*, Boisd. Erichson states that in *Scitala* the apical joint of the labial palpi is obconic and incrassate (as it is in the numerous species referred to above) and he so figures it. But in *S. geminata*, Boisd., it is elongate, cylindric, and very slender. The shape of that joint is a very important character which that eminent specialist Dr. Sharp relies upon as a leading distinction of his genus *Anodontonyx*. I find, moreover, that all the species known to me congeneric with *S. sericans* have the base of the

prothorax margined while in *Sericesthis geminata*, Boisd., the prothorax has no basal margin. On these grounds I have concluded that *Scitala* and *Sericesthis* are both valid genera, and I know of no other species than *geminata*, Boisd. (=*pruinosa*, Dalm.) that can be attributed to the latter.

Dr. Sharp's genus *Anodontonyx* has the labial palpi of *Scitala* as figured and described by Erickson [a fact which Dr. Sharp seems to have overlooked,—probably taking *S. pruinosa* on Lacordaire's authority as the species of (so-called) *Scitala* with which he compared his *Anodontonyx*,—though he probably has seen also some true *Scitala* for he says that the apical joint of the labial palpi in *Scitala* is "generally" slender]. *Anodontonyx* however is perfectly distinct from both *Sericesthis* and *Scitala* by another character (mentioned by Dr. Sharp) viz. that the antennal club is short. This is more fully expressed by saying that in *Anodontonyx* the antennal club is alike in the sexes while in *Scitala* it is much longer in the male than in the female and in both sexes is considerably longer than that of *Anodontonyx*.

Boisduval and Erichson appear to have included species of other genera in their *Sericesthis* and *Scitala* respectively (a matter with which I hope to deal in the next part of this series of papers) but that does not appear to touch the validity of the genera inasmuch as their characters should rest in the one case on the characters of the species to which the name was first applied (without a diagnosis) and in the other case on the diagnosis.

The seven species described by me in my paper referred to above under the name *Sericesthis* (on the assumption that *Sericesthis* and *Scitala* are identical) I must now transfer to *Scitala* (regarding that genus as distinct from *Sericesthis*).

Nosphisthis (gen. nov. *Sericoidarum*).

Mentum antice vix perspicue emarginatum; palpi labiales sat breves, articulo ultimo subconico; palpi maxillares parum elongati, articulo ultimo quam præcedens vix longiori; labrum sat prominulum, antice (superne visum) emarginato-truncatum; oculi sat magni nitidi vix manifeste granulati, antice a cantho profunde incisi; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata, quam palporum maxillarium articulus ultimus haud longiori; prothorax transversus; elytra striata (haud geminatim); tibiæ anticæ extus 3-dentatæ, posticis sat brevibus ad apicem dilatatis intus arcuatis; unguiculi parvi simplices, sed ad basin lamella membranacea instructi; sterna pilis longis minus dense vestita.

This genus has the facies of *Frenchella*, from which it is readily distinguished by the membranous lamella at the base of each claw, as well as by the form of the apical joint of the labial palpi and of the antennal club. I suspect the type is a female, but I have no doubt the male scarcely differs in external structure ; I do not recollect an instance of an Australian *Melolonthid* having an extremely abbreviated antennal club in the female and a longer one in the male. I judge the type to be a female only because its tarsi are short and slender. The sexual distinctions in the genera to which this is related are very slight, usually almost confined to the length of the tarsi where the antennal club is not in both sexes notably longer than it is in the insect before me.

N. parvicornis, sp. nov. Fem.? Sat nitida ; rufo-ferruginea ; pilis elongatis fimbriata ; corpore subtus pygidioque pilosa ; capite confertim rugulose punctulato, clypeo late truncato-rotundato, antice fortiter reflexo ; antennis 9-articulatis, clava perbrevi quadrata 3-articulata ; prothorace fortiter transverso, antice fortiter angustato, sparsius (quam caput multo minus crebre) punctulato, lateribus sat æqualiter arcuatis, angulis anticis vix acutis posticis obtusis, basi minus fortiter bisinuata ; scutello punctulato ; elytris sat fortiter sat æqualiter striatis, interstitiis fortius vix crebre punctulatis ; pygidio subopaco, creberrime subtilissime ruguloso-punctulato ; tarsis brevibus ; articulo apicali inter unguiculorum baseos lamina instructo ; unguiculis brevibus fortiter curvatis. Long., $6\frac{1}{2}$ l.; lat. $3\frac{1}{5}$ l.

N.S. Wales ; taken by Mr. Lea at Forest Reefs.

FRENCHELLA.

In addition to the species of Blanchard and Burmeister already mentioned by me (Pr. Linn Soc, N.S.W., 1892, p. 104) as probably needing to be transferred from *Haplonycha* to *Frenchella*, I find that *H. iridescens*, Blanch., is almost certainly a *Frenchella* ; I have examples before me which seem to be clearly that species The following are new ones.

F. hispida, sp. nov. Sat nitida ; ferruginea, prothorace prope marginem lateralem medium macula obscura notato ; supra pilis elongatis fimbriata et in capite elytris pygidioque pilis longis erectis sparsim vestita ; subtus sat pilosa ; capite crebre fortiter rugulose punctulato, clypeo antice rotundato modice (minus quam *F. lubrici*, Black.) reflexo ; antennis 8-articulatis, clava sat elongata 3-articulata ; prothorace sat fortiter transverso, antice fortiter angustato, quam caput multo minus crebre punctulato, lateribus superne visis a

basi ad medium fere parallelis hinc antrorsum subsinuatim convergentibus (a latere visis, paullo pone medium rotundato dilatatis), angulis anticis acutis posticis acutis nonnihil dentiformibus, basi bisinuata ; scutello punctulato ; elytris sat æqualiter striatis, interstitiis subconvexis sat fortiter punctulatis ; pygidio fere ut elytra punctulata et pilosa.

Maris antennarum clava quam articuli ceteri conjuncti haud breviori ; feminæ paullo breviori. Long. 6—6½ l., ; lat. 3—3⅘ l.

For remarks on this species see the following (*F. approximans*). Victoria and N.S. Wales.

F. approximans, sp. nov. Sat nitida ; fusca, antennis palpisque dilutioribus, nonnullorum exemplorum elytris et corpore subtus plus minusve rufescentibus ; ut *F. hispida* pilosa ; capite antennisque ut *F. hispidæ* ; prothorace sat fortiter transverso, antice fortiter angustato (nonnullorum exemplorum obsolete canaliculato), quam caput vix minus crebre punctulato, lateribus superne visis fere ut *F. hispidæ* sed a latere visis multo minus fortiter (et vix pone medium) rotundato-dilatatis ; cetera ut *F. hispidæ*. Long. 6—7 l. ; lat. 2⅘—4 l.

This species is readily distinguishable from nearly all the other described Australian Sericoid *Lamellicornes* with simple claws by the long slender erect hairs that are thinly placed in longitudinal rows on its elytra. It is, however, extremely close to *F. hispida* from which it differs by its darker color, the considerably closer puncturation of its prothorax and the different lateral outline of its prothorax. If this be looked at from the side it is seen in *F. hispida* to form a strong curve the extreme convexity (that is, the point where the prothorax is at its greatest width) of which is markedly behind the middle, whereas in the present species it is only very feebly curved outward, and the extreme convexity of the curve is scarcely behind the middle of the length of the lateral margin. Owing to the declivity of the sides of the prothorax this difference is scarcely noticeable when the prothorax is looked at from above.

N.S.W. ; Sydney and northern districts.

F. hirticollis, sp. nov. Sat nitida ; fusca, plus minusve rufescens ; fere ut *F. hispida* pilosa sed pilis erectis in prothorace ut in elytris vestita ; capite ut *F. hispidæ* ; antennis 9-articulatis, clava sat elongata 3-articulata ; prothorace sat fortiter transverso, antice angustato, dupliciter punctulato (puncturis majoribus solis setiferis), lateribus superne visis modice arcuatis (latitudine majori pone medium posita) basin versus sinuatis (a latere visis fere ut *F. hispida* sed etiam magis fortiter rotundato-dilatatis) ; cetera ut *F. hispidæ*.

Maris antennarum clava quam articuli ceteri conjuncti haud breviori; feminæ paullo breviori. Long., 7– $7\frac{1}{2}$ l.; lat., $3\frac{1}{2}$—$3\frac{4}{5}$ l.

Allied to the preceding two, but easily distinguishable by the following characters :—The antennæ nine-jointed, the prothorax (as well as the elytra) clothed with long erect pilosity, the prothoracic puncturation consisting of two kinds of punctures intermingled (one kind manifestly smaller than the punctures on the prothorax of *hispida* and non-setiferous, the other kind much larger and setiferous), the sides of the prothorax very manifestly sinuate behind the middle (viewed from above) and evidently more abruptly—indeed almost sub-angularly—dilated behind the middle, and more abruptly declivous (viewed from the side).

N.S.W. ; all the specimens I have seen are, I believe, from the Sydney district.

F. aspericollis, sp. nov. Mas. Sat nitida; fusco-rufescens; pilis elongatis fimbriata, capite pygidioque pilis erectis vestitis, corpore subtus piloso; capite antennisque ut *F. hispidæ*; prothorace fere ut *F. hispidæ* sed creberrime aspere punctulato; elytris magis subtiliter punctulato; pygidio (exempli typici) longitudinaliter fortiter carinato; cetera ut *F. hispidæ*.

Fem. latet. Long., $5\frac{1}{2}$ l.; lat., 3 l.

Near *F. hispida* but with elytra devoid of erect setæ (I do not think this is due to abrasion). Very distinct also by the extremely close asperate puncturation of the prothorax and the very evidently finer puncturation of the elytral interstices, as well as by the strongly carinate pygidium,—though I do not find the carination of the pygidium a reliably constant character in all the Australian *Lamellicornes*.

N.S. Wales ; Armidale ; given to me, I believe, by the late Mr. Olliff.

F. sparsiceps, sp. nov. Mas. Sat nitida; rufescens; pilis elongatis fimbriata, corpore subtus piloso; capite postice minus fortiter minus crebre haud rugulose (parte media fere lævi), clypeo (hoc minus brevi antice rotundato) magis crebre magis æqualiter, punctulatis; antennis 9-articulatis, clava quam articuli ceteri conjuncti sat longiori; prothorace sat fortiter transverso, antice fortiter angustato, sparsius (quam *F. hispidæ* sat minus crebre) punctulato, cetera ut *F. hispidæ*; scutello sat lævi; elytris fere ut *F. hispidæ* sed interstitiis multo minus grosse punctulatis.

Fem. latet. Long., 6 l.; lat. $3\frac{1}{2}$ l.

I have seen two males of this species—both in inferior condition and both taken by Mr. Lea near Sydney. The species is at

once distinguishable from all the preceding by its much more sparsely and smoothly punctured head. In both the examples before me there are two large faintly marked impressions between the eyes, but this is probably not a constant character. *F. sparsiceps* is also distinguishable from all the preceding except *hirticollis* by its nine-jointed antennæ, and from that species by its considerably longer antennal club and the absence of erect pilosity on the upper surface.

N.S. Wales.

ANACANTHOPUS (gen. nov. *Sericoidarum*).

Mentum subangustum; palpi labiales sat breves, articulo ultimo minus elongato subovali; palpi maxillares elongati, articulo ultimo quam præcedens duplo longiori; labrum parvum sed distinctum, parum exstans, antice (superne visum) emarginatum; oculi modici sat nitidi, subtiliter granulati, antice a cantho incisi; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata [hac maris (?) quam articuli 2–6 conjuncti vix longiori]; prothorax transversus; elytra striata (haud geminatim); coxæ posticæ quam metasternum parum breviores; tibiæ anticæ extus bidentatæ, posticis brevibus ad apicem valde dilatatis spinoso-ciliatis (sed haud calcaribus a ciliis distinctis armatis) certo adspectu bilobis; unguiculi simplices; sterna breviter sparsim pilosa.

A very remarkable genus which I refer with much hesitation to the *Sericoides*. The species described below has the facies of a *Dynastid*, and I have not a specimen which I can afford to damage to the extent that would be necessary to examine its abdominal stigmata, but its nine-jointed antennæ justify me I think in excluding it from the *Dynastides*. Assuming it to be a *Melolonthid* there is nowhere to place it but in the *Sericoides* from which I can find no structural character to separate it. But wherever it be placed the remarkable structure of its hind tibiæ should make it easy to recognise. These are extremely dilated at the apex where they bear a continuous fringe of strong stout spines but nothing that can be distinguished from the rest of these spines as being "apical spurs." It is to be noted that its eyes are smaller and more distinctly granulated than in most of the genera allied to *Colpochila* and *Sericesthis*, and thus approximate to the *Caulobius* type, but as they project laterally as far as the clypeus I think the genus should be grouped with the former two rather than the last-named. The evident resemblance on facies to the next genus *(Engyops)* which is certainly a *Sericoid* tends to confirm this in the place I have given it. I am uncertain of the sex of the specimen before me but I do not think that important since (from the analogy of allied genera) it is

unlikely that if it be a female the male differs materially except in probably having a longer antennal club. I have not been able to make a proper examination of the front margin of the mentum (which is rugulose and clothed with extremely long setæ, and therefore difficult to study without dissection).

A. inermis, sp. nov. Sat late ovalis; minus convexus; sat nitidus; supra sat glaber; supra piceo-niger, corpore subtus antennis palpis pedibusque rufescentibus; capite cum clypeo crebre grosse, prothorace sparsim minus fortiter, pygidio sat grosse, punctulatis; prothorace leviter transverso, antice fortiter angustato, lateribus fortiter rotundatis, basi utrinque subsinuata, angulis anticis acutis vix prominulis posticis rotundato-obtusis; elytris substriatis, striis sat fortiter punctulatis, interstitiis subtilius seriatim punctulatis sat planis; tarsorum posticorum gracilium articulo basali quam 2as sublongiori. Long., $3\frac{1}{2}$ l.; lat., $1\frac{4}{5}$ l.

Tropical Queensland.

ENGYOPS (gen. nov. *Sericoidarum*).

Mentum sat angustum; palpi labiales sat breves, articulo ultimo minus elongato, subdilatato, ad apicem acuminato; palpi maxillares elongati, articulo ultimo quam præcedens duplo longiori; labrum modicum, bene exstans, antice (superne visum) emarginato-truncatum; oculi permagni inter se subapproximati, sat nitidi, subtiliter granulati, antice a cantho incisi; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata (hac maris quam articuli 2-6 conjuncti paullo longiori); prothorax transversus; elytra striata (haud geminatim); coxæ posticæ minus elongatæ; tibiæ anticæ extus 3-dentatæ, posticis sat brevibus ad apicem modice dilatatis; unguiculi simplices; sterna sparsim pilosa.

The species for which I propose the above generic name must certainly I think stand near the preceding one (*Anacanthopus inermis*) on account of the close resemblance between them in respect of the oral organs (the narrow rough mentum clothed with very long sparse setæ, the very long apical joint of the maxillary palpi, &c.), and a decided agreement in facies. The present insect however has a less marked resemblance to a *Dynastid* and differs from the preceding in several important structural characters. It is distinguished from all the other Australian *Sericoides* so far as my observation goes by its very large eyes, the interval between which is so narrow that the middle part of the head (limited in front by the clypeal suture, on the sides by the eyes, and behind by a line joining the hind extremities of the eyes) is scarcely if at all wider than long.

E. spectans, sp. nov. Sat late ovalis ; minus convexa ; subnitida ; supra sat glabra ; ferruginea ; capite crebre fortius, prothorace sparsim minus fortiter, pygidio fortiter minus crebre, punctulatis ; prothorace sat transverso, antice fortiter angustato, lateribus leviter arcuatis, basi utrinque vix sinuata, angulis anticis acutis vix prominulis posticis rotundato-obtusis ; elytris sat fortiter punctulato-striatis, interstitiis sat fortiter nec seriatim punctulatis subconvexis ; tarsorum posticorum articulo basali quam 2as sublongiori. Long., $3\frac{1}{5}$ l. ; lat. $1\frac{1}{5}$ l.

Southern Queensland,

COLPOCHILODES (gen. nov. *Sericoidarum*).

Mentum antice sat fortiter emarginatum ; palpi fere ut *Frenchellæ* (labialibus modicis articulo ultimo sat elongato sat cylindrico, maxillaribus sat elongatis articulo ultimo quam præcedens sat longiori) ; labrum totum plus minusve exstans, antice (superne viso) truncato vel late emarginato ; oculi sat magni nitidi vix manifeste granulati, antice a cantho profunde incisi ; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata (hac maris angusta elongata quam articuli præcedentes conjuncti vix breviori, feminæ multo breviori) ; prothorax transversus ; elytra geminato-striata ; tibiæ anticæ extus tridentatæ, posticis fere ut *Sericesthis* (elongatis, gracilibus, intus fere rectis) ; unguiculi simplices ; sterna pilis elongatis dense vestita.

The species for which I propose the above new generic name cannot be satisfactorily placed in any previously characterised genus. With the general characters in other respects of a *Colpochila* it combines the hind tibiæ of a *Sericesthis*,—slender, elongate, and having their inner edge straight, which gives it a facies quite unlike that of either of the above named genera. Besides the species described I have seen two others from W. Australia, but as each of them is represented by a unique female it would not be wise to describe them at present.

C. raucipennis, sp. nov. Elongato-ovatus ; sat nitidus ; supra fere glaber, sternis femoribusque pilosis ; ferrugineus vel piceo-ferrugineus ; clypeo crebre subfortiter, capite postice acervatim minus fortiter, prothorace sparsius (ad latera sat crebre) sat fortiter, elytris sat grosse rugulose, pygidio minus crebre subfortiter, punctulato ; prothorace postice haud marginato, sat transverso, lateribus (superne visis) pone medium fere rectis, angulis anticis subacutis minus prominulis posticis rotundato-obtusis, basi utrinque sinuata ; scutello lævi ; elytris geminato-striatis, interstitiis nonnullis angustis convexis sed sculptura nonnihil propter rugositatem obscura ;

tarsorum posticorum articulo basali quam 2[us] parum breviori. Long., 7—8½ l.; lat., 3½—4 l.

W. Australia; Perth, Albany, &c.

NESO (gen. nov. *Sericoidarum*).

Mentum antice leviter emarginatum; palpi labiales modici, articulo ultimo subcylindrico haud vel vix dilatato, sat elongato; palpi maxillares modici, articulo ultimo quam præcedens sat longiori; labrum in medio vix prominulum, antice (superne visum) emarginato-truncatum; oculi magni nitidi subtilissime granulati, antice a cantho profunde incisi; antennæ (specierum cognitarum) 9-articulatæ, clava 3-articulata (hac maris quam articuli 1-6 conjuncti haud breviori, feminæ sat breviori); prothorax transversus, basi haud marginata; elytra varie striata; coxæ posticæ minus elongatæ; tibiæ anticæ extus 3-dentatæ, posticis sat brevibus ad apicem dilatatis intus arcuatis; unguiculi simplices; sterna sparsim pilosa.

This genus (which seems peculiar to tropical Australia) differs from *Colpochila* in facies more widely than in structural characters. It is however distinct by several good characters,—especially its prothorax not margined at the base its short hind coxæ and the sparseness of the pilosity on its sterna. The canthus cutting into the front part of the eye moreover is much less divergent from the clypeal outline than in *Colpochila*, being evidently a mere prolongation of the clypeus, while in *Colpochila* it has the appearance of a carina distinct from the clypeal outline. It should be noted that this genus presents the very rare (among the Australian *Sericoides*) character of including among species with simply striate, one at least with geminate-striate, elytra. In the latter however the striation is very different from that of *Colpochila*, *Scitala*, &c., the width of the interstices between stria and stria of the pairs being very little less than of the alternate interstices and all the interstices being equally flat, whereas in *Colpochila*, &c., the wider interstices are twice as wide (or more) as the narrower ones and the latter are distinctly more convex than the former.

N. usta, sp. nov. Ovata; sat convexa; nitida; supra glabra; rufo-brunnea, capite prothorace pedibusque obscuris; capite cum clypeo sat crebre sat grosse, prothorace sparsius subfortiter, punctulatis; prothorace sat fortiter transverso, antice fortiter angustato, lateribus sat rotundatis, basi retrorsum declivi utrinque vix sinuata, angulis anticis acutis subprominulis posticis rotundato-obtusis; elytris subtilius punctulato-striatis, interstitiis subtilius confuse punctulatis, planis; tarsorum posticorum articulo basali quam 2[us] subbreviori.

Maris antennarum clava quam articuli 1-6 conjuncti vix longiori, pygidio nitido sparsim distincte punctulato.

Feminæ antennarum clava sat breviori, pygidio minus nitido subobsolete punctulato. Long., $4\frac{1}{2}$—$5\frac{1}{2}$ l.; lat., $2\frac{1}{4}$—3 l.

Tropical Queensland.

N. yorkensis, sp. nov. Ovata; modice convexa; nitida; supra glabra; rufa, elytris antennisque testaceis; capite cum clypeo crebre fortiter, prothorace sparsim subfortiter, pygidio sparsim subtilius, punctulatis; prothorace sat fortiter transverso, antice fortiter angustato, lateribus sat rotundatis, basi retrorsum declivi utrinque manifeste sinuata, angulis anticis acutis subprominulis posticis obtusis (vix rotundatim); elytris minus regulariter striatis, striis fortius punctulatis, interstitiis sat planis sparsim fortius punctulatis; tarsorum posticorum articulo basali quam 2us distincte breviori.

Maris antennarum clava quam articuli 1—6 conjuncti fere sesqui longiori.

Feminæ antennarum clava quam articuli 1—6 conjuncti sat breviori. Long., $5\frac{1}{2}$ l.; lat., $2\frac{4}{5}$ l.

Differs from the preceding in color, also in the much longer antennal club of the male, the prothorax notably less strongly declivous hindward across the base, the considerably stronger puncturation of the elytra, the absence of sexual difference in the sculpture of the pygidium, &c.

Tropical Queensland.

N. planicollis, sp. nov. Ovata; modice convexa; nitida; supra glabra; rufa vel rufo-testacea, capite infuscato, prothorace magis obscure rufo, elytris antennisque pallidis; capite quam clypeus manifeste minus crebre, prothorace sparsim subfortiter, punctulatis; prothorace fortiter transverso, antice sat fortiter angustato, lateribus sat rotundatis, basi haud retrorsum declivi utrinque parum sinuata, angulis anticis acutis parum prominulis posticis obtusis (vix rotundatim); elytris geminato-striatis, striis sat fortiter punctulatis, interstitiis (ex his, alternis quam cetera paullo angustioribus minus punctulatis vix convexioribus) sat fortiter confuse punctulatis; tarsorum posticorum articulo basali quam 2us sat breviori.

Maris antennarum clava quam articuli 1—6 conjuncti plus quam sesquilatiori, pygidio sparsim subfortiter punctulato.

Femina latet. Long., $5\frac{4}{5}$ l.; lat., 3 l.

Resembles the preceding *(N. yorkensis)* in color but differs from it in the considerably longer antennal club of the male (which to a casual glance looks about twice as long as all the

preceding joints together), in the basal part of the prothorax not being declivous hindward, in the elytral stria distinctly running in pairs, &c.

Tropical Queensland.

SCITON.

For the original diagnosis (P. L. S., N.S.W., 1892, p. 101) it will be well to substitute the following fuller one.

Clypeus antice truncatus, lateribus sinuatis; mentum antice emarginatum, lateribus pone apicem profunde excisis; palpi labiales modici, articulo ultimo dilatato; palpi maxillares parum elongati, articulis robustis (apicali 2° longitudine æquali quam 3us sat longiori); labrum vix exsertum, antice (superne viso) truncatum vel late vix emarginatum; oculi magni nitidi vix manifeste granulati, antice a cantho profunde incisi; antennæ (specierum cognitarum) 9-articulatæ, clava 3-articulata (hac maris * cogniti quam articuli præcedentes 5 conjuncti paullo longiori, feminæ paullo breviori); prothorax transversus; elytra geminato-striata; tibiæ anticæ extus tridentatæ, posticis fere ut Sericesthis (elongatis, gracilibus, intus fere rectis); unguiculi simplices; sterna pilis erectis sat brevibus minus perspicuis vestita, pedibus sparsim pilosis.

A very distinct genus on account of the form of the clypeus (recalling that of *Mœchidius*), the peculiar excision of the sides of the mentum disclosing the extreme base of the labial palpi, and the scarcely exserted labrum resembling that of the genus I take to be *Ocnodus*.

S. paullus, sp. nov. Ovatus, minus elongatus; subopacus, nonnihil pruinosus; supra glaber; rufo-ferrugineus, antennis palpisque testaceis; clypeo nitido in medio subgibbo crebre squamose, capite postice prothoraceque vix manifeste, elytris parum distincte, pygidio nitido subtiliter sat crebre, punctulatis; prothorace sat transverso, antice minus angustato, lateribus leviter arcuatis, basi utrinque leviter sinuata, angulis anticis acutis minus prominulis posticis superne visis sat (nec acute) rectis; elytris geminato-striatis, interstitiis alternis angustioribus subconvexis; tarsorum posticorum articulo basali quam 2us paullo longiori. Long., 5—5¾ l.; lat. 2⅘—3 l.

Very much like *S. ruber*, Blackb., but much smaller, and easily distinguished *inter alia* by its clypeus being quite gibbous in the middle longitudinally (so that from a certain point of view it appears foveate on either side) and by the notably longer basal

* *i.e. S. paulli*, sp. nov.

joint of its hind tarsi. I have before me a third species of this genus (also from W.A.) which is not however in fit state for description.

W. Australia.

DYSPHANOCHILA (gen. nov. *Sericoidarum*).

Mentum antice leviter emarginatum; palpi labiales modici, articulo ultimo subconico sat dilatato; palpi maxillares elongati, articulo ultimo quam præcedens multo longiori; labrum a clypei parte antica verticali nullo modo discretum; oculi magni nitidi vix manifeste granulati, antice a cantho profunde incisi; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata (hac maris quam articuli præcedentes conjuncti multo longiori, feminæ haud observatæ); prothorax transversus; elytra haud manifeste striata; tibiæ anticæ extus 2-dentatæ, posticis elongatis minus robustis intus fere rectis; unguiculi simplices; sterna femoraque pilosa.

This genus is easily distinguished by the total absence of any distinction between the labrum and the deep downward-vertical front face of the clypeus (which is even more complete than in the genus that I take to be *Ocnodus*), in combination with hind tibiæ of the *Sericesthis* type. Its facies is something like that of *Anodontonyx*.

D. pilosipennis, sp. nov. Sat brevis, sat lata; modice nitida; supra pilis subtilibus elongatis erectis sparsius vestita, subtus in sternis femoribusque pilosa; brunneo-testacea; clypeo crebrius fortiter, capite postice sparsim sat grosse, prothorace fere ut clypeus sed paullo minus crebre, elytris crebrius sat fortiter, pygidio fortius minus crebre, punctulatis; clypeo antice rotundato-reflexo; prothorace postice in medio haud marginato, transverso, antice angustato, angulis anticis minus acutis minus prominulis posticis acutis leviter retrorsum prominulis, basi utrinque sinuata; elytris haud distincte striatis; tarsorum posticorum articulo basali quam 2us paullo breviori. Long., $4\frac{1}{2}$ l.; lat., $2\frac{2}{5}$ l.

An easily recognisable species on account of the long erect hairs clothing the upper surface. In one example I can detect no indication of elytral striæ, in the other there are very faint traces of striæ arranged in pairs; they are however scarcely distinguishable, but sufficient to show that the striation, such as it is, is of the geminate type.

W. Australia; Swan R. Taken by Mr. E. F. W. Blackburn and Mr. Lea.

HAPLOPSIS.

M. Lacordaire regards this genus as identical with *Heteronyx*. His remarks seem to imply that he had seen at least one of its

species, but it is difficult to believe he can really have done so, as he says that it has "entirely the general appearance" of *Heteronyx*, —which is far indeed from being the case. Together with a very *different* facies, it has simple claws and the club of the antennæ remarkably elongated. Structurally it is near *Caulobius* (which Lacordaire also merges in *Heteronyx*, quite erroneously I am convinced). Superficially it is easily separated from *Caulobius* by the presence (at any rate in all the described species) of conspicuous pubescent vittæ on the elytra; but it is difficult to specify satisfactory *structural* distinctions because *Caulobius* must I think for the present be allowed to embrace species that will probably have to be treated eventually as types of distinct genera. The insect which Burmeister has described as *Caulobius* (*Sericesthis cervina*, Boisd.) is I think pretty certainly not congeneric with *C. pubescens*, Le Guillou; but as I have not to my knowledge seen the former I am unable to deal with the matter confidently, and must treat *Caulobius* sufficiently loosely to include in it both those which Burmeister attributes to it. Regarded thus, the only one of Burmeister's characters that seems reliable is a very slight (but as far as my observation goes a very constant) one, viz. the presence in *Caulobius* but not in *Haplopsis* of a minute tooth on the external margin of the front tibiæ close to the base of those organs. In his tabulation Burmeister distinguishes the two genera by the form of the labrum, which in *Caulobius* is said to be,—and in *Haplopsis* not to be,—prominent and separated by a distinct suture from the vertical front face of the clypeus. This holds good in respect of *Haplopsis* and *Caulobius pubescens* but not in respect of some other species before me which, I feel confident, are congeneric with *C. cervina*. So again Burmeister says there are eight joints in the antennæ of *Cuulobius* and nine in those of *Haplopsis*,—but the variability of the Australian *Heteronycides* in very closely allied species of numerous genera is so great as to render this character worthless. The other notable distinctive character mentioned by Burmeister, —viz. the presence of sexual variation in the clypeus of *Haplopsis* and not of *Caulobius*,—is an important one if constant,—but I have not before me (and still less had Burmeister before him) a sufficiently long series of species and specimens to say confidently whether it *is* constant. That *Haplopsis* and *Caulobius* are two thoroughly good genera I should say there is not the shadow of a doubt,—nor have I much doubt that all Burmeister's distinctive characters (except that founded on the number of antennal joints) will stand, but I suspect that Burmeister's diagnosis of *Caulobius* was drawn up on *C. pubescens* only and that *C. cervinus* if examined would be found not to correspond with the diagnosis of *C. pubescens* in respect of the labrum and to differ in other

respects of generic importance. Owing to this suspicion I have included among the new species under *Caulobius* (below) some species which I place in the genus only provisionally (as probably congeneric with *C. cervinus*, Burm., ? Boisd.), but for which I think a new generic name will be required eventually.

H. debilis, sp. nov. Piceo-nigra; subænescens; subnitida; capite prothoraceque pilis elongatis erectis pallide brunneis, elytris pilis decumbentibus griseis vittatim positis, corpore subtus pedibusque pilis albidis sat crebre, vestitis; capite prothoraceque sat crebre nec fortiter punctulatis; hoc fortiter transverso, antice angustato, lateribus leviter arcuatis, angulis anticis productis posticis obtusis; elytris obscure rugulosis, 5-lineatim (plus minusve manifeste) longitudinaliter convexis, lineis glabris vix rugulosis.

Maris clypeo antice truncato subtiliter marginato, antennarum clava elongata.

Feminæ clypeo rotundato, antennarum clava minus elongata. Long., $2\frac{1}{2}$—3 l.; lat., $1\frac{1}{5}$—$1\frac{2}{5}$ l.

Easily distinguishable by the form of the clypeus which in front is simply truncate in the male and rounded in the female with its margin not reflexed. The prothorax is notably less coarsely punctulate than in its allies and the tarsi are much more slender than those of *H. lineoligera*, Blanch.

S. Australia; Eyre's Peninsula.

H. Olliffi, sp. nov. Obscure viridis; subnitida; supra pilis griseis (in elytris vittatim dispositis), subtus pilis albidis vestita; capite prothoraceque grosse minus crebre punctulatis; hoc minus fortiter transverso, antice angustato lateribus arcuatis, angulis anticis productis posticis obtusis; elytris granulato-rugulosis, 5-lineatim (plus minusve manifeste) longitudinaliter convexis, lineis glabris vix rugulosis.

Maris clypeo antice fortiter reflexo, producto, late truncato; antennarum clava modice elongata.

Feminæ clypeo antice vix producto, anguste reflexo, late truncato; antennarum clava vix minus elongata. Long., 3 l.; lat., $1\frac{2}{5}$ l.

The decidedly green coloring of this species distinguishes it from all its known congeners except *viridis*, Blackb., and the clypeus of its male strongly produced and upturned in front with the apex sharply truncate distinguishes it from them all.

Northern N.S. Wales; given to me by the late Mr. Olliff.

H. lineoligera, Blanch. The synonymy of this species was given wrongly by Burmeister, and has been taken over by other authors from him. A very casual comparison of descriptions renders this manifest, and it seems incomprehensible that Bur-

meister could have made such a mistake; equally so that he should have re-described under another name *(grisea)* an insect which he believed to be already described by Blanchard and then have deliberately placed Blanchard's name as a discarded synonym below his own. Is it possible he can have thought this course justified by the fact that the specimen he described bore a MS. name affixed to it by Hope at a date possibly earlier than that of Blanchard's publication? However that may be *H. pilosa*, Burm. (and not *grisea*, Burm.) is evidently the same as *lineoligera*, Blanch., and therefore the name *pilosa*, Burm., must drop (as a synonym of *lineoligera)* and *grisea*, Burm., must stand as a good species.

CAULOBIUS.

I have discussed this genus above in connection with *Haplopsis*. The following species are I think new.

C. punctulatus, sp. nov. Sat nitidus; subcylindricus; rufescens, capite prothorace metasternoque picescentibus; pilis brevibus pallidis suberectis minus confertim vestitus; capite rugulose sat grosse sat crebre punctulato, clypeo antice truncato sat fortiter reflexo; prothorace transverso, antice angustato, rugulose grosse sat crebre punctulato, lateribus arcuatis (latitudine majori paullo pone medium posita) basin versus subsinuatis, angulis anticis acutis posticis subrectis, basi media modice lobata; scutello parum manifeste punctulato; elytris fortiter sat grosse crenulato-striatis, interstitiis angustis inæqualiter nec fortiter convexis; tibiis anticis dentibus 2 prope apicem sat magnis et altero minuto ad basin externis armatis; antennis 9-articulatis, clava sat elongata quam articuli ceteri conjuncti vix breviori; tarsis 4 anterioribus (posticis exempli typici carentibus) modice elongatis, articulis ad apicem fortiter clavatis 2° quam 1us longiori. Long., 3 l.; lat., $1\frac{3}{5}$ l.

I am uncertain of the sex of the unique type of this species, as I do not find any very reliable external sexual characters in *Caulobius*. The labrum is scarcely distinct from the front face of the clypeus and is pointed behind, its point being opposite to an emargination of the mentum.

W. Australia; taken by Mr. Meyrick, near Albany.

C. advena, sp. nov. Subnitidus; subcylindricus; piceo-brunneus antennarum stipite tarsis elytrisque plus minusve rufescentibus; pilis brevibus pallidis suberectis subtilibus minus confertim vestitus; capite crebrius minus grosse minus profunde punctulato, clypeo antice truncato sat fortiter reflexo, antennis 9 (?) articulatis, clava sat elongata quam articuli ceteri conjuncti vix breviori; prothorace transverso, antice

angustato, crebre minus profunde (nullo modo grosse) punctulato, lateribus arcuatis (latitudine majori paullo pone medium posita) basin versus manifeste sinuatis, angulis anticis acutis posticis sat acute rectis, basi media modice lobata ; scutello vix manifeste punctulato ; elytris inæqualiter subtilius punctulato-striatis, interstitiis sat latis inæqualiter minus fortiter convexis ; tibiis anticis et tarsis anterioribus 4 ut *C. punctulati*, tarsorum posticorum articulo 2° quam 1us plus quam duplo longiori. Long., 3 l.; lat., $1\frac{3}{5}$ l.

Very close to the preceding structurally but with the sides of the prothorax evidently more sinuate near the base, the hind angles distinctly sharper, the color throughout (very notably that of the antennal club) quite different, the puncturation of all the upper surface much feebler and finer, &c. It should be noted that there is a difference in the form of the clypeus between these two species for although it is truncate in both when viewed from above, its front outline viewed from in front is straight in this species but sinuate in *C. punctulatus*. The labrum seems to differ somewhat in form from that of *C. punctulatus* the middle of its hind margin not appearing pointed, but that difference is possibly only apparent as in the unique type of the present species the labrum is closely in contact with the mentum and in the other is fully exposed. The antennæ are in a very unfavorable position for examination of the minute joints that form the funiculus and I cannot get sight of them with a microscope but I am almost sure they are 9-jointed.

Australia or Tasmania ; exact habitat not known, but probably Tasmania, as a considerably broken specimen in my collection from that island does not seem to me to differ from the type except in larger size (long. $3\frac{2}{5}$ l.) and decidedly more rufescent elytra.

C. discedens, sp. nov. Subnitidus ; brevior ; niger, capite prothoracis lateribus sutura antennis pedibusque obscure rufuscentibus ; pilis brevibus suberectis albidis sat confertim vestitus ; capite sat fortiter minus crebre vix rugulose punctulato, clypeo antice truncato sat fortiter reflexo ; antennis 9-articulatis, clava sat elongata quam articuli ceteri conjuncti vix breviori ; prothorace sat transverso, antice angustato, rugulose grosse sat crebre punctulato, lateribus arcuatis (latitudine majori paullo pone medium posita) basin versus subsinuatis, angulis anticis acutis posticis subrectis, basi media modice lobata ; scutello coriaceo ; elytris confuse vix perspicue sed sat grosse punctulato-striatis, interstitiis minus angustis leviter valde inæqualiter convexis ; tibiis anticis ut *C. punctulati* sed brevioribus magis latis ; tarsis anterioribus

4 fere ut *C. punctulati* sed brevioribus minus gracilibus; tarsis posticis sat brevibus, articulo 2° quam 1us vix duplo longiori. Long., $2\frac{1}{2}$ l.; lat. $1\frac{2}{5}$ l.

Differs from *C. punctulatus* (apart from color and size) chiefly as follows:—The clypeus viewed from in front is not sinuate; the prothorax is less strongly transverse; the sculpture of the elytra is extremely confused (and difficult to describe) consisting of coarse but not deep punctures which run unevenly in indistinct striæ and have an *ill-defined* appearance, their interstices very little raised and much wider than in *punctulatus* and extremely irregular (here and there almost disappearing in vague rugulosity) and generally much serrated by the seriate punctures (in *punctulatus* the punctures of the striæ being markedly coarser and deeper and much more regularly seriate); the tibiæ are conspicuously shorter and evidently wider (though with similar external dentation, two well defined teeth close to the apex and one minute tooth at the extreme base); the anterior 4 tarsi are manifestly stouter and shorter; the whole insect is shorter and wider. The much coarser puncturation of the prothorax readily separates this species from *C. advena*.

W. Australia; taken by Mr. E. Meyrick.

C. compactus, sp. nov. Subnitidus; brevis; niger; palpis antennarumque stipite dilutioribus; pilis erectis in capite prothoraceque sat longis ferrugineis, in elytris brevibus pallidis vestitus; capite sat grosse crebrius rugulose punctulato, clypeo antice truncato fortiter reflexo; antennis 9-articulatis, clava elongata quam articuli ceteri conjuncti haud breviori; prothorace minus fortiter transverso, antice angustato, grosse rugulose sat crebre punctulato, lateribus arcuatis, (latitudine majori paullo pone medium posita), angulis anticis acutis posticis subrectis, basi media modice lobata; scutello coriaceo leviter inæquali; elytris minus distincte punctulato-striatis, interstitiis angustis vix convexis obscure rugulosis; tibiis anticis ut *C. punctulati*; tarsis anterioribus 4 fere ut *C. punctulati* sed intermediis quam antici sat brevioribus; tarsis posticis elongatis gracilibus, articulo 2° quam 1us plus quam duplo longiori. Long., 2—$2\frac{2}{5}$ l.; lat. $1\frac{1}{10}$—$1\frac{3}{10}$ l.

This species is in general facies much like *C. discedens* but is notably blacker with the prothorax less strongly transverse and much more closely punctured; the elytra also are very differently sculptured; to a casual glance their sculpture might be described as closely rugulose the rugulosity having a seriate arrangement, but when closely examined they are seen to be in reality closely striate-punctulate, the rows of punctures so close as to be almost

confluent and the intervals (both between series and series and between puncture and puncture of the series) squamose-rugulose in such fashion as greatly to obscure the puncturation.

Mountains of Victoria and N.S. Wales.

C. evanescens, sp. nov. Minus nitidus ; sat brevis ; niger, palpis antennarum stipite et nonnullorum exemplorum tarsis dilutioribus ; pilis pallidis decumbentibus vestitus ; capite crebrius sat grosse punctulato, clypeo sat elongato antice minus lato subrotundato vix reflexo ; antennis 9-articulatis, clava sat elongata quam articuli ceteri conjuncti vix breviori ; prothorace leviter transverso, antice leviter angustato, crebrius rugulose sat grosse punctulato, lateribus arcuatis (latitudine majori vix pone medium posita), angulis anticis acutis posticis obtusis (sed bene determinatis), basi media minus fortiter lobata ; scutello coriaceo parum inæquali ; elytris crebre minus fortiter seriatim punctulatis, parum rugulosis, interstitiis minus distinctis ; tibiis anticis fere ut *C. punctulati* sed brevioribus latioribus ; tarsis ut *C. discedentis*. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

This minute *Lamellicorn* is evidently allied to *C. discedens* but may be at once separated from it and from all the other described *Caulobii* by its clypeus evidently more elongate and very much less strongly reflexed at the apex. Although I have not broken off an antenna for examination under a microscope (the only way to be absolutely certain of the number of minute joints in the funiculus) I have, I think, seen quite plainly through a Coddington lens that there are four joints in the funicle,—so that the antennæ are nine-jointed.

W. Australia ; taken by Mr. E. Meyrick.

MÆCHIDIUS.

This genus presents the difficulty usual in Australian entomology of containing a certain number of species so vaguely described that it is impossible to identify them without examining the types. The number of names that have been given to species of *Mæchidius* is, I believe, 33 (excluding *Albertisi*, Fairm., *bilobiceps*, Fairm., and *gracilis*, Waterh., which have not the prosternal sutures open to receive the antennæ and have the *Sericid* structure of the mouth ; they are allied to *Diphucephala* and are members of, or very near to, the genus *Epholcis*). Of the 33 names really appertaining to *Mæchidius* four must be dropped as synonyms, viz. *Kirbyanus*, Westw. = *spurius*, Kirby, *excisus*, Waterh. = *rugosicollis*, Macl., *raddonanus*, Westw. = *sordidus*, Boisd., and *sinuaticeps*, Blackb. = *mellyanus*, Westw. Of the remaining 29, two (viz. *obscurus*, Macl., and *parvulus*, Macl.) are so slightly described that it is impossible to form a clear idea of

them and I am obliged to pass them by. Thus I regard the genus as at present consisting of 27 valid species to which I shall presently add eight additional ones. Of the 27, there are six that I have been unable to identify, on which I offer the following notes.

M. spurius, Kirby is from N.S. Wales. It is a large species (long., 5 l.) with simple claws, the clypeus very feebly emarginate, the basal angle of the prothorax obtuse, the elytra with rows of minute tubercles, and the hind tibiæ with their external apical process extremely elongate. This latter character enables me to place it confidently in tabulating the genus. I have no doubt the *Mœchidius* from W.A. which Mr. Waterhouse (Tr. E. S. Lond. 1875 p. 193) thinks a possible var. of *spurius* is *mellyanus*, Westw., which at p. 201 of the same paper the author mentions as unknown to him.

M. brevis, Waterh., from North Queensland, is scarcely described, the remarks on it consisting of little more than the mention of certain differences from *M. ater*, Waterh., without any definite statement whether in all respects not specified the description of *M. ater* stands good for *M. brevis*. Thus there is a considerable element of doubt about some of the characters,—*e.g.*, the color (which is unusual and probably constant in *M. ater*). If *M. brevis* is of the same deep black color as *M. ater*, I have not seen it. If it is of a different color the description is valueless.

M. corrosus, Waterh., is a large species (long., $5\frac{1}{2}$ l.) from Tasmania with appendages to the claws, and the hind angles of the prothorax "not at all acute." I have seen nothing like it.

M. sexdentatus, Waterh., is a rather small species (long. $3\frac{3}{4}$ l.) from Adelaide with the head "tridentate on either side." Among the numerous South Australian examples of *Mœchidius* that I have seen there is not one with the head sculptured as that of *sexdentatus* is said to be. The only species I have seen from any locality with sculpture at all approaching it has the sides of the prothorax excised (which they do not appear to be in *sexdentatus*) and is from Sydney and agrees very well with the description of *M. emarginatus*, Waterh.

M. Froggatti, Macl., is a species of moderate size (long., 4 l.) from N.W. Australia. The only very notable character in the description is a costa running hindward from the humeral angle (?the humeral "callus"). I do not think I have seen the insect. *M. antennalis* (described below) has such a costa, but is quite different in other respects from the description.

M. bidentulus, Fairm., is a small species (long., 3 l.) from Queensland. It has simple claws and is said to be notable by the presence of two blunt teeth on the head. I am satisfied that I have not seen it.

It should be added that the identification of *M. sordidus*, Boisd., seems rather doubtful. Boisduval's description would apply to almost any *Mœchidius*, but Mr. Waterhouse (loc. cit.) gives some information regarding it which he says is founded on "authentic specimens," but without stating the grounds on which he considers them "authentic." Moreover there is a considerable difficulty in understanding his remarks. Under the heading of *M. sordidus* he says that that species is one of the commonest *Mœchidii* in S. Australia, and describes its prothorax as "very slightly narrowed posteriorly, the posterior angles slightly less than right angles." I can at once identify the insect (which is the only common one in S. Australia, and also occurs in Victoria and N.S. Wales) on which that description is founded, but under the description of the next species *(M. emarginatus)* Mr. Waterhouse speaks of the "posterior emargination" of the prothorax in "the preceding (species)" and says that *emarginatus* is closely allied to it. These statements appear quite impossible to reconcile with each other. I, however, suppose that by some means the place of *emarginatus* in the memoir was changed after the description was written and that *sordidus* was not intended by "the preceding," but some other species (perhaps *excisus*, Waterh.). Therefore I take *sordidus*, Waterh., to be the insect on which the remarks under the name "*sordidus*" were founded, —not that referred to (under the heading "*emarginatus*") as "the preceding."

Mœchidius is a genus in which the species are for the most part easily distinguishable *inter se* by well marked characters, and are readily tabulated. There is however one character that it is impracticable to disregard in a tabulation, but which nevertheless cannot conveniently be used without a few preliminary remarks, and that is the form of the hinder part of the prothorax, which is alike in scarcely any two species of the genus. But the gradations of difference from one species to another are not marked enough to make easy the division of the species into groups founded on this character. In a few species the base of the prothorax is straight or evenly curved, with the sides also evenly curved; then we find species in which the base is more or less sinuate and the sides evenly curved; then species in which the sinuation of the base becomes so strong that it should be called rather an "excision" (in some the excision being so angled at both ends that there is an opening for question which is the true basal angle); and then species in which the excision takes in more or less of the *side* of the prothorax so distinctly that there can be no hesitation in calling the hinder extremity of the excision the "hind angle of the prothorax." I have tried several methods of forming groups on this

character and find the most workable to be founded on the difference between a "sinuation" and an "excision" without regard to the question whether the inequality is in the side or the base. Even taking this as the crucial point, there is nevertheless a possibility of doubt in respect of a few species which group the insect should be referred to, and therefore it seems desirable to specify *M. clypealis*, *acutangulus*, and *imitator* as species in respect of which there is room for doubt whether the emargination of the hind part of the prothorax should be regarded as a strong sinuation or a moderate excision. With this qualification I believe that it will be easy to distinguish the described species by means of the following tabulation.

A. Claws without basal appendage.
  B. Upper surface not clothed with long erect hairs.
    C. Hind tibiæ normal (not as CC).
      D. Prothorax not excised in its hinder part.
        E. Hind tarsi not particularly slender,—their basal joint notably shorter than the next two together.
          F. External apical process of hind tibiæ very long,—about same length as longer spur on inner side.
            G. Hind angles of prothorax acute — *mellyanus*, Westw.
            GG. Hind angles of prothorax obtuse — *spurius*, Kirby.
          FF. External apical process of hind tibiæ notably shorter.
            G. Hind angles of prothorax very acute and strongly prominent hindward.
              H. Elytra with well defined costæ — *latus*, Waterh.
              HH. Elytra not costate ... — *ater*, Waterh.
            GG. Hind angles of prothorax right or moderately acute, not (or scarcely) prominent hindward
              H. Clypeus very strongly triangularly excised in front.
                I. Prothorax of normal convexity — *major*, Blackb.
                II. Prothorax strongly convex longitudinally ... ... — *gibbicollis*, Blackb.
              HH. Clypeus widely and feebly emarginate in front.
                I. Basal joint of hind tarsi about same length as apical joint.
                  J. Base of prothorax feebly sinuate ... ... — *crenaticollis*, Blackb.
                  *JJ. Base of prothorax profoundly sinuate on either side ... ... — *clypealis*, Blackb.
                II. Basal joint of hind tarsi notably shorter than the apical joint ... ... — *ordensis*, Blackb.
            GGG. Hind angles of prothorax obtuse (though not at all rounded off) — *collaris*, Blackb.
          EE. Hind tarsi slender,—their basal joint about as long as the next two together.

F. Hind angles of prothorax acute ... *longitarsis*, Waterh.
FF. Hind angles of prothorax obtuse (much rounded off) ... ... *rufus*, Hope.
DD. Prothorax in hinder part distinctly excised,—the basal edging not continuous round the excision.
E. A distinct angle immediately in front of the excision.
F. The prothorax considerably narrowed in front.
G. Basal joint of hind tarsi very short, not longer than apical spur of tibiæ
*H. The angle at front of prothoracic excision strongly dentiform ... ... *acutangulus*, Waterh.
*HH. The angle at front of excision not dentiform ... ... *imitator*, Blackb.
GG. Basal joint of hind tibiæ considerably longer than apical spur of tibiæ ... ... *rugosicollis*, Macl.
FF. The prothorax as wide in front as at base ... ... *modicus*, Blackb.
EE. No angle at front of prothoracic excision ... ... *hopeanus*, Westw.
CC. Hind tibiæ angularly dilated externally at about the middle of their length.
D. Prothorax very sparsely punctulate ... *tibialis*, Blackb.
DD. Prothorax closely punctulate ... *rugosipes*, Blackb.
BB. Upper surface clothed with long erect hairs.
C. The uppermost external tooth of front tibiæ placed at about the middle of their length ... ... *pilosus*, Blackb.
CC. The uppermost external tooth of front tibiæ placed much below the middle of their length ... ... *variolosus*, Macl.
AA. A quill-like appendage at the base of each claw.
B. Prothorax not excised in front of the hind angles.
C. Joints of the antennal club shorter than the rest of the antennal joints together.
D. Uppermost tooth of the front tibiæ placed at about the middle of the length of the tibiæ.
E. Base of prothorax strongly sinuate on either side, so that the angles are acute.
F. Puncturation of prothorax not particularly coarse.
G. Interstices of the elytral striæ wide (each with two rows of punctures) ... ... *sordidus*, Boisd.
GG. Interstices of elytral striæ much narrower, — the striæ being much more numerous ... *multistriatus*, Blackb.

* These species may be considered intermediate between the group in which the prothorax is excised and that in which it is merely sinuate in its hinder part.

FF. Puncturation of prothorax extremely coarse ... ... *macleayanus*, Westw.
EE. Base of prothorax not sinuate,—the angles not acute ... ... *caviceps*, Blackb.
DD. Uppermost tooth of front tibiæ placed considerably below middle of length of tibia ... ... *atratus*, Burm.
CC. Joints of antennal club as long as the rest of the antennal joints together ... *fissiceps*, Macl.
BB. Prothorax excised in front of the hind angles.
C. Club of antennæ three-jointed.
D. Side of prothorax with a strong angle in front of the excision ... ... *emarginatus*, Waterh.
DD. Side of prothorax rounded at front of excision ... ... *excisicollis*, Blackb.
CC. Club of antennæ five-jointed ... ... *antennalis*, Blackb.

M. gibbicollis, sp. nov. Late subovatus minus depressus; minus nitidus; piceus, antennis testaceis; setulis brevibus subtilibus minus crebre vestitus; capite antice triangulariter fortiter exciso, lateribus sat fortiter bisinuatis; prothorace gibbo fortiter transverso, antice sat angustato, confertim rugulose punctulato, lateribus sat fortiter crenulatis modice arcuatis, angulis anticis subacutis sat productis posticis rectis (vix acute), basi utrinque sat fortiter sinuata; elytris crebre punctulato-substriatis, interstitiis nonnullis leviter convexis quam ceteri paullo latioribus; tibiis anticis extus fortiter 3-dentatis (dentibus intervallis sat æqualibus inter se divisis); tarsorum posticorum articulo basali quam 2us parum longiori; unguiculis simplicibus. Long., 4½ l.; lat., 2½ l.

This species bears a strong resemblance to *M. fissiceps*, Macl., but belongs to a different section of the genus owing to its having no quill-like appendages at the base of its claws. Its clypeus scarcely differs from that of *M. fissiceps*, but *inter alia* the general form of the insect is considerably wider and shorter, the prothorax is less narrowed anteriorly and the teeth of its front tibiæ are much larger more acute and more evenly spaced *inter se*. It must also be near *M. bidentulus*, Fairm. (which has similar claws), but that insect is described as a *small* species (long. 6 mm.) of oblong form with the sides of the elypeus not sinuate, while the present insect is much larger, is of exceptionally short wide form, and has the sides of the clypeus strongly sinuate. The strong longitudinal convexity of the prothorax (best observed by looking at that segment from the side) is a little more marked than in *M. fissiceps* and distinguishes it from most of its congeners.

W. Australia; Roebuck Bay. Given to me, I believe, by Mr. J. J. Walker.

M. ordensis, sp. nov. Minus brevis, sat parallelus; minus nitidus; nigro-piceus, antennis dilutioribus; setulis minutis sparsim vestitus; capite antice leviter late nec triangulariter emarginato, lateribus vix sinuatis; prothorace sat fortiter transverso, antice parum angustato, confertim aspere nec grosse punctulato, lateribus subtilissime crenulatis leviter arcuatis, angulis anticis subacutis modice productis posticis obtusis retrorsum subprominulis, basi utrinque sat fortiter sinuata; elytris crebre striatis, striis sat latis, interstitiis latis convexis biseriatim punctulatis et transversim rugatis (sculptura latera versus confusa); tibiis anticis extus (exemplorum visorum) obsolete obtuse 3-dentatis; tarsorum posticorum articulo basali crasso quam 2us paullo longiori; unguiculis simplicibus. Long., $3\frac{2}{5}$ l.; lat., $1\frac{3}{5}$ l.

A rather narrow parallel little species, with a general resemblance to *M. modicus*, but differing by its clypeus only feebly and roundly emarginate in front with front angles quite rounded off, its prothorax not emarginate before the hind angles which are obtuse, and the much shorter and thicker basal joint of its hind-tarsi. In the two examples before me the front tibiæ are externally feebly trisinuate rather than toothed, but it is possible this is due to the apex of the teeth having been worn off.

W. Australia; sent by Mr. Lea from Ord River, Kimberly district.

M. collaris, sp. nov. Sat brevis, latus; minus nitidus; piceus, antennis dilutioribus; setulis brevibus gracilibus testaceis suberectis vestitus; capite antice late minus profunde triangulariter emarginato, lateribus sat fortiter sinuatis; prothorace fortiter transverso, antice sat angustato, sat fortiter minus crebre punctulato, lateribus sat arcuatis, angulis anticis sat acutis modice prominulis posticis obtusis, basi recta; elytris substriatis, interstitiis planis vix in æqualibus puncturis sat magnis papillatis biseriatim impressis; tibiis anticis extus obtuse 3-dentatis (dentibus inferioribus 2 approximatis a 3° sat remotis); tarsorum posticorum articulo basali quam 2us sat longiori; unguiculis simplicibus. Long., 4 l.; lat., $2\frac{1}{5}$ l.

This species is very notable in the genus through the base of its prothorax being quite straight,—not at all sinuate.

S. Australia; I have no record of the exact locality of capture.

M. imitator, sp. nov. Modice elongatus; subnitidus; piceus subrufescens, antennis dilutioribus; setulis brevissimis adpressis sat sparsim vestitus; capite antice sat fortiter triangulariter emarginato, lateribus latis leviter sinuatis, angulo ante oculum acute recto; prothorace fortiter trans-

verso, antice fortiter angustato, crebre fortiter rugulose punctulato, lateribus fortiter rotundatis perspicue crenulatis, angulis anticis minus prominulis minus acutis posticis oblique semicirculariter emarginatis (angulo ante emarginationem obtuso bene definito); elytris punctulato-substriatis, interstitiis inæqualibus (nonnullis quam cetera latioribus) irregulariter granulis rugisque nitidis ornatis; tibiis anticis extus obtuse tridentatis (dentibus inferioribus 2 subapproximatis, a 3° modice remotis; tarsorum posticorum articulo basali brevi quam 2us vix longiori; unguiculis simplicibus. Long., 4 l.- lat., $1\frac{4}{5}$ l.

Allied to *M. rugosicollis*, Macl., easily distinguishable by the characters indicated above in the tabulation.

Australia; I am not certain of the exact locality, but believe it to be in Victoria.

M. modicus, sp. nov. Minus elongatus; minus nitidus; piceus plus minusve rufescens; setulis minimis gracilibus minus crebre vestitus; capite antice triangulariter sat fortiter exciso, lateribus sat fortiter sinuatis antice subacutis; prothorace fortiter transverso, antice parum angustato, confertim rugulose nec grosse punctulato, lateribus subtiliter crenulatis leviter arcuatis, angulis anticis obtusis minus productis posticis oblique semicirculariter (fere ut *M. excisi*, Waterh.) emarginatis, angulo ante emarginationem fere recto; elytris crebre striatis, interstitiis leviter convexis inæqualiter rugulosis vel granulosis (nonnullis quam cetera paullo latioribus); tibiis anticis extus 3-dentatis (dentibus inferioribus 2 approximatis a 3° sat remotis); tarsorum posticorum articulo basali quam 2us fere duplo longiori; unguiculis simplicibus. Long., $3\frac{1}{2}$ l.; lat., $1\frac{4}{5}$ l.

A very distinct species but bearing a general resemblance to *M. excisus*, Waterh., from which, however, it is readily distinguished *inter alia* by the much deeper excision of the clypeus, the much slighter narrowing of its prothorax in front, and the much greater length of the basal joint of its hind tarsi.

Coolgardie, W. Australia; sent by Mr. Lea.

M. multistriatus, sp. nov. Modice elongatus; subnitidus; piceus, antennis testaceis; setulis brevibus gracilibus suberectis minus crebre vestitus; capite antice sat fortiter triangulariter emarginato, lateribus latis sat fortiter sinuatis; prothorace fortiter transverso, antice modice angustato, crebre rugulose nullo modo grosse punctulato, lateribus sat fortiter arcuatis, angulis anticis obtusis sat prominulis posticis subacutis retrorsum directis, basi utrinque fortiter sinuata; elytris crebre striatis, interstitiis transversim aspere rugatis

(certo adspectu nonnullis quam cetera paullo latioribus); tibiis anticis extus 3-dentatis (dentibus inferioribus 2 approximatis a 3° sat remotis); tarsorum posticorum articulo basali quam 2us sat longiori, apicali elongato; unguiculis singulis ad basin appendiculis singulis gracilibus armatis. Long., $4\frac{1}{5}$—5 l.; lat. 2—$2\frac{2}{5}$ l.

It is difficult to believe that this common species is undescribed and yet there seems to be no doubt that such is the case. It is nearest, I think, to *macleayanus*, Westw., to which it bears considerable resemblance; but it differs from that species *inter alia* in the wider form and less coarse puncturation of its prothorax and in the sculpture of its elytra; these in *macleayanus* present alternately more and less convex lines, the former more nitid and rugulose than the latter; in the present species the lines of sculpture are equally *inter se* convex nitid and rugulose and are narrower and separated from each other by more defined and numerous striæ. The tarsi of *macleayanus*, moreover are shorter and more robust.

N.S.W. (Sydney, Forest Reefs, &c.)

M. excisicollis, sp. nov. Minus elongatus; sat opacus; piceus, antennis dilutioribus; setulis brevibus gracilibus suberectis minus crebre vestitus; capite antice sat fortiter triangulariter emarginato, lateribus latis fortiter sinuatis; prothorace fortiter transverso, antice angustato, crebre granuloso-punctulato, lateribus fortiter rotundatis obsolete crenulatis, angulis anticis sat prominulis vix acutis posticis oblique semicirculariter emarginatis (angulo ante emarginationem nullo); elytris seriatim punctulatis (puncturis singulis basi tuberculis nitidis instructis); tibiis anticis extus 3-dentatis (dentibus inferioribus 2 approximatis, a 3° sat remotis); tarsorum posticorum articulo basali quam 2us paullo longiori; unguiculis singulis ad basin appendiculis singulis gracilibus armatis. Long., 5 l.; lat., $2\frac{1}{2}$ l. (vix).

A very distinct species with the prothorax very like that of *hopeanus*, Westw., but more narrowed in front, and having the basal angles dentiform; and differing from *hopeanus inter alia* by the presence of quill-like appendages at the base of the claws; also like *emarginatus*, Waterh., but differing from it *inter alia* by there being no angle before the posterior emargination of the sides of the prothorax.

Victoria; in the S. Australian Museum.

M. antennalis, sp. nov. Minus elongatus; sat opacus; castaneo-piceus, antennis testaceis clava elongata 5-articulata; setulis sat gracilibus sat elongatis adpressis minus crebre vestitus; clypeo antice late subtruncato ad latera recto, angulis anticis

acute rectis; prothorace fortiter transverso, antice haud angustato, leviter minus crebre punctulato, in disco bifoveolato, lateribus leviter sinuato-arcuatis subtilissime crenulatis, angulis anticis obtusis minus prominulis posticis subquadratim emarginatis, angulo ante emarginationem fere recto; elytris sat crebre punctulato-substriatis, interstitiis angustis inter se æqualibus (sed costa sat fortis postice longe abbreviata a callo humerali, et altera sublateralis antice breviter abbreviata a callo subapicali, procedunt); tibiis anticis extus 3-dentatis (dentibus inferioribus 2 approximatis a 3° sat remotis); tarsorum posticorum articulo basali quam sequentes 2 conjuncti haud breviori; unguiculis singulis ad basin appendiculis singulis gracilibus armatis. Long., 4 l.; lat., 2 l.

The extraordinary antennæ of this species with a club consisting of five very elongate joints (longer than all the preceding joints together) of which that nearest the base is a little shorter than the rest distinguish it from all its described congeners known to me. I do not think the character to be sexual inasmuch as of *fissiceps* (which has almost as elongate an antennal club though only three-jointed) I have seen enough specimens to render the presence of both sexes probable and I do not find any difference in the antennæ of different examples.

N. S. Wales; a single specimen taken near Sydney.

MELOLONTHIDES (true).

RHOPÆA.

R. hirtuosa, sp. nov. Sat elongata (præsertim mas); subtiliter pubescens et pilis erectis sat numerosis (præsertim in prothorace) vestita; testacea vel fusco-testacea; capite prothoraceque confertim aspere (clypeo grosse minus crebre nec fortiter) quam *R. heterodactylæ*, Germ. multo minus subtiliter, elytris dupliciter (ut *heterodactylæ*), pygidio ut prothorax, punctulatis; prothorace quam longiori fere duplo latiori, antice fortiter angustato, lateribus crenulatis modice arcuatis, angulis posticis obtusis; elytris ut *heterodactylæ* subcostatis.

Maris antennarum flabello elongato 7-articulato, articulo 3° (antennarum) intus producto.

Feminæ antennarum flabello brevi 5-articulato, articulis 4° 5° que (antennarum) intus productis. Long., 10 l. (mas.) 9 l. (fem.); lat., $4\frac{1}{2}$—5 l.

This species is allied to *heterodactyla*, Germ. and *soror*, Blackb. (from the other described species its closely punctured prothorax in combination with a 7-jointed male antennal flabellum at once distinguish it) from both of which it differs by the presence of

numerous long erect hairs on the upper surface (they are almost wanting in *heterodactyla* and *soror*) and by the markedly stronger and more asperate puncturation of its prothorax, and from *soror* also by the much less strongly rounded sides of that segment. The antennæ of the male are very similar to those of the two species just named but the female has the club of its antennæ only 5-jointed (in *soror* it is 6-jointed,—I do not know the female of *heterodactyla*, but Germar implies that its antennal club is 7-jointed).

N.S. Wales.

R. morbillosa, sp. nov. *R. Mussoni* affinis. Minus elongata; supra breviter sparsim pubescens; testacea vel fusco-testacea; capite rugulose inæqualiter, prothorace fortiter vix crebre (quam *heterodactylæ* multo minus crebre), elytris rugulose sat grosse, pygidio confertim aspere, punctulatis; prothoracis conformatione fere ut *R. hirtuosæ* sed angulis posticis rectis bene determinatis; elytris subcostatis (fere ut *R. heterodactylæ*).

Maris antennarum flabello elongato 5-articulato, flabelli articulis 1° 2° que quam ceteri multo brevioribus (hoc quam ille longiori ad apicem profunde emarginato).

Fem. latet.

The club of the antennæ in the male having only three long joints at once separates this species from all its described congeners. In other respects it is very much like *R. Mussoni*, Blackb., but differs *inter alia* in its prothorax considerably more closely, and its elytra evidently more coarsely, punctured.

N.S. Wales; taken by Mr. Lea near Forest Reefs.

On Two Deep-Level Deposits of Newer Pleistocene in South Australia.

By Professor Ralph Tate.

[Read June 7, 1898.]

The majority, if not all, of the low-level tracts fringing our coastline is generally known to be occupied by recent marine accumulations, indicating an elevation of about 12 to 14 ft. around St. Vincent's Gulf, and thence westward to Fowler's Bay (see Trans. R. Soc., S. Aust., II, 1879, pp. lxvii-lxix and 114; IV, 1881, p. 45; and XIII, 1890, pp. 172 and 181). In the South-East, stretching from Lake Alexandrina to the plateau of the Mount Gambier limestone, similar deposits of recent marine shells underlay this extensive paludinal area (see Woods, "Geol. Obs.," pp. 183 *et seq.*).

With the exception of the Port Creek shell-limestone (see Trans. Roy. Soc., S. Aust., X, 1888, p. 31), which extends from 18 to 26 ft. below high tidemark, no tangible evidences of deep-seated deposits of a like nature have been brought to scientific notice, though a passing reference to such an occurrence in the Tintinara bore was made at my instigation by Mr. E. V. Clark (Trans. Roy. Soc., S. Australia, XX, p. 115). The desirability of publishing particulars of the indications of recent marine deposits at considerable depths in the Port Pirie bore has influenced me in furnishing the data which fix a like age for the chief fossiliferous beds passed through in the Tintinara bore, though more than a decade has passed since the completion of that work, more especially so as my analyses extend the depth of the newer deposits for a further depth of 90 ft. than that stated by Mr. Clark.

TINTINARA BORE.

This bore was executed by our Department of Water Supply. Samples of the beds passed through and explanatory manuscript formed part of an exhibit staged by the Hydraulic Department in the Jubilee Exhibition held at Adelaide in 1887. This exhibit is now in the museum of our School of Mines, and the samples from Tintinara have been critically examined by me.

The Tintinara bore is located in the Ninety-mile Desert in near proximity to a station of that name on the railway line connecting Adelaide and Melbourne. Its site is sixty-two feet above sea level, and the main fossiliferous deposits extend in depth from 60 to 100 feet, though marine shells appear at 26 feet and at 154 to 244 ft. The deposits to 154 ft. in depth consist essentially of loose shell debris, with varying admixture of sand ; viewed as a whole, the shell debris is, by its nature and the species of molluscs represented, analogous to shell banks which occur between tide-marks on sheltered beaches of to-day, such for example as Hardwicke Bay.

The majority of the species, though not living between tide-marks, are those either frequent or not uncommon among the accumulation of shells on many of our beaches. The accompanying list of species is based on the examination of about two pints of material, belonging to the School of Mines, in three equal parts from 60 to 70, 70 to 80, and 90 to 100 ft. in depth ; and about half-a-pint in the aggregate from depths ranging from 154 to 244 ft. received from the Conservator of Water. All the commoner species occur at all the depths to 100 ft., so that a record of the position of the rarer forms was not considered necessary, but I have added the occurrences below that depth in support of my contention that the containing beds are Newer Pleistocene and not Eocene.

Some of the identifications in the subjoined list, either from the fragmentary, juvenile, or rolled condition of the specimens on which they have been based, are not certain though approximately correct ; these are indicated in the list by a sign of doubt after the author's name.

All the determined species, as a result of comparison with authenticated specimens, are with three exceptions living in our seas. The exceptions are :—*Strigilla sp.*, this is represented by very little more than the hinge-line of a medium-sized left valve and by a right valve, 6 by 5 mm.; there can be no doubt as to the generic location, but the incomplete outline of the fragment and the very juvenile size of the perfect valve do not permit with safety an identity with the only Australian species of the genus, *S. Senegalensis*, occurring in North Queensland (Port Douglas, ex Brisbane Museum). The very much finer and closer sculpture does not agree with that on an equal area of the umbonal region of the Queensland shell. A minute Erycinid, genus and species yet to be determined, and *Syrnola Jonesiana* are the other exceptions, both occur in abundance. These I cannot associate with any Australian species known to me either by actual specimens or figures.

Summary of Strata

Passed through in the Tintinara Bore. (Surface 62 ft. above sea-level).

	Depth in Feet.
Recent (Terrestrial).	
Travertine, compact and rubbly	0 — 24
Newer Pleistocene (Marine).	
Sand (a few marine shells)	24 — 26
Yellow and grey sands (shells very abundant)	26 — 154
White friable calcareous silt (apparently comminuted polyzoal debris, shells rare)	154 — 160
Black clay (with scattered shells)	160 — 244
Eocene (Marine).	
Blackish-brown sand (with numerous fossils)	244 — 253

Total thickness of the Newer Pleistocene beds is 220 ft., extending in depth from 38 ft. above sea level to 182 ft. below it.

The calcareous silt (154-160 ft.) was regarded by Mr. Clark as the equivalent of the polyzoal limestone of our Eocene, but, as may be gathered from my List, the under-laying black clay (160-244 ft.) contains the same species of mollusca as occur in the beds over-laying it.

To account for a few Eocene fossils in the washings from the material labelled 220-244 ft., there has been some reconstruction of the Eocene-surface or the basal portions of the black clay and the upper-most portion of the Eocene sand-bed have been accidently mixed in the process of boring. But recognition of their respective sources is easy by the fact that the Pleistocene-shells show lustre in contrast with the dark-brown colour and opacity of the tests of the Eocene-species. The Bankiviæ from 220-244 ft. still retain their colour-markings, and the Erycinid bivalve is quite pellucid.

List of Species.*

[The prefixed asterisk denotes abundance.]

Purpura textiliosa, *Lamarck.*
*Nassa monile, *Kiener.* Also 145-154 ft.
Marginella muscaria, *Lamarck.*
Marginella muscaria, var. minor. At 220-244 ft.
*Marginella turbinata, *Lamarck.* Also 220-244 ft.
Columbella semiconvexa, *Lamarck.*
*Neverita conica, *Lamarck.*
Neverita sagittata, *Menke?*
Bittium estuarinum, *Tate.*
*Syrnola Jonesiana, *Tate.*

*Examples are included in the Palæontological Collection at the Museum of the School of Mines.

Rissoia (Sabanæa) Tasmanica, *Ten.-Woods.*
Calliostoma Allporti, *Ten.-Woods.*
Trochocochlea constricta, *Lamarck.*
*Bankivia fasciata, *Menke.* Also to 244 ft.
Adelactæon casta, *A. Adams.*
Volvulella rostrata, *A. Adams.*
Corbula tunicata, *Hinds.*
Corbula scaphoides, *Hinds.* At 180-200 ft.
*Mactra rufescens, *Lamarck.*
Mesodesma elongata, *Deshayes.*
Mesodesma erycinæa, *Lamarck.*
Strigilla sp., . Also 145-154 ft.
Rupellaria mitis, *Deshayes?* Also 145-154 ft.
Chione undulosa, *Lamarck?*
*Gen. et sp. Erycinidæ (not determined). Also 220-244 ft.
Carditella infans, *E. A. Smith?*
*Nuculana crassa, *Hinds.* Also to 244 ft.
Limopsis Forskali, *A. Adams.*
Magasella Cumingi, *Davidson.* At 154-160 ft.

PORT PIRIE BORE.

Operations at this bore were suspended at the date of preparation of this communication, after having passed through to a depth of 574 ft. of incoherent deposits, and a further depth of 61 ft. in siliceous clay-shales and limestones of Cambrian age. At the date of the reading of this paper the boring had been resumed, but with what object one is at a loss to understand, as previously a finality had been secured both from geological and economical standpoints. Samples of the beds passed through and a statement of their respective thicknesses have been obligingly placed in my hands by the Conservator of Water. From these data the following descriptive tabular schedule of the boring has been drawn up :—

Surface-level 14 ft. above low water-mark.

NEWER PLEISTOCENE.

	Depth in feet.		
Light blue clay	—	—	30
Mottled clayey gritty sand. Marine shells	30	—	90
Reddish sub-angular gritty sandy clay. Marine shells	90	—	110
Light grey calcareous silt, slightly argillaceous, with *Plecotrema ciliatum*... ...	110	—	136
Brown clay with included subangular siliceous and calcareous grit. Marine shells	136	—	150
Mottled (red and gray) gritty clay. Salt water	150	—	178
Red-yellow sand or sandrock, consisting of coarse moderately abraded grains ...	178	—	180
Light red and cream colored mottled clay	180	—	276

Yellowish grey sandy clay. A little salt water	276	—	290
Very fine grained, yellow, sand-rock. Brackish water	290	—	360

INFRA EOCENE?

Fine grained, white, sand-rock, colored black by carbonaceous matter	360	—	455
Fine grained, white, sand-rock, colored black by carbonaceous matter. With iron pyrites	455	—	485
Brown, slightly argillaceous, sand-rock (color discharged on heating)	485	—	490
Brown and black bituminous clayey sand-rock	490	—	527
Fine grained clayey sand and sandy clay, with bituminous stains. Stock water	527	—	560
Sand with lignite fragments	560	—	574

CAMBRIAN.

Siliceous shales and limestones	574	—	641

Washings for macro-organisms have yielded the following results :—

Depth of 50-ft.—*Cerithium tenue*, Sowb. ; and *Clanculus Dunkeri*, Phil.

Depth of 70-ft.—*Cerithium tenue.*

Depth of 130-ft.—*Plecotrema ciliatum*, Tate.

Depth of 150 to 170-ft.—*Cerithium tenue ; Diala lauta*, A. Adams ; *Odontostomia Angasi*, Tryon ; *Cyclostrema Tatei*, Angas ; *Pseudoliotia micans*, var. *simplicior*, Tate ; *Clanculus Dunkeri* ; and *Utriculus eumicrus*, Crosse.

[NOTE.—The majority of the foregoing species has been presented to the Museum of the School of Mines.—R.T.]

The species and individuals are few in number ; but, considering the very small bulk of the material under analysis, they are proportionately rich. All, with one exception, are living in South Australian waters, and are commonly cast-up on our shell beaches. The exception is a varietal form of a somewhat common littoral shell—*Cyclostrema micans.*

Passing upwards from the Cambrian bed-rock, there are 314 ft. of unfossiliferous beds, more or less carbonaceous. These indicate a land-accumulation. Whether or not, they are virtually cotemporaneous with the overlying marine-beds, or are on the same horizon as similar beds passed through in the Kent Town-bore,*

* Trans. Roy. Soc., S. Aust., V, 1882, p. 43 ; and XIII, 1890, pl. 4.

which underlay Marine Eocene, it is impossible to say. The succeeding 182 ft. of sandy and clayey beds, though unfossiliferous, have so much the character of the overlying strata with marine shells that they may be reasonably regarded as forming part of the same series. The chief fossiliferous beds range between 90 and 150 ft., but in the midst of them, at about 130 ft., is a band of calcareous silt charged with *Plecotrema ciliatum* in an excellent state of preservation. This pulmoniferous mollusc is living at extreme high tide-mark in the marine marshes abutting on the Port Creek, whilst the fine calcareous silt is analogous to the shell-travertine which delimits the margin of an upraised Pleistocene sea-bed, extending from Glenelg via Dry Creek to beyond Virginia. This ancient silt with Plecotrema must, therefore, at the period of its accumulation have been at the line of junction of sea and land, and is indicative of an actual depression of 130 ft. below high water-mark. The associated beds, from 30 to 150 ft. in depth, are, from their contained organic remains, shore-line accumulations, and the total amount of depression evidenced thereby is a few feet less than 150 ft. below high water-mark.

DESCRIPTIONS OF NEW SPECIES.

Odontostomia Jonesiana, *Tate*, 1898.

Shell narrowly pyramidal, a little more than three times as long as wide, shining-white and smooth. Spire-whorls eight in a length of six millimetres, of moderately rapid increase, flat, separated by a well-defined linear suture. Last whorl with a regularly convex base; aperture pyriform, with a stout elevated plait at the origin of the columella, inner front angle of aperture slightly effuse and thickened with a slightly reflexed edge. Length, 6·25, vix; breadth, 2·0, vix, mm.

If *Syrnola* is a valid genus, then the present species belongs thereto. Among Australian species known to me by actual specimens it has the following alliances. It is narrower than *S. jucunda* and broader than *S. tincta*, but differs from both in its longer aperture and the far-backward position of the columella-plait; in respect of its apertural characters, it resembles *S. infrasulcata*, mihi, which is, however, a robust shell and has a sculptured body-whorl.

The species-name is in compliment to Mr. J. W. Jones, Conservator of Water, whose continued interest in the promotion of stratigraphical and palæontological investigations is abundantly evinced in the present communication.

PSEUDOLIOTIA MICANS, *A. Adams*, VAR. SIMPLICIOR, *Tate*, 1898.

Cyclostrema micans is the type of a new genus, *Pseudoliotia* which I propose to establish. The present variety differs by the acute axial costæ, which do not form nodulations on the spiral carinæ. In consequence, the periphery appears markedly truncate with a deep concave sulcus between the two peripheral keels. Nevertheless, the normal forms show some variation in the density of the nodulation and by decrescence of that character would graduate into the variety here described. Unfortunately only one example (an adult) was found, and that of 2 mm. diameter. This size is much smaller than usual, which ranges up to 4 mm., yet it is not smaller than a micromorph, which occurs abundantly at Port Western, Victoria, or than *Liotia speciosa*, Angas, which is conspecific.

Notes on the Graphitic Slates and associated Rocks in the Kalgoorlie District.

By H. B. Corbin, B.Sc.

(Communicated by Professor Tate.)

[Read June 7, 1898.]

On November 12, 1897, at a meeting of the Boulder Literary and Debating Society, Mr. Bethune read a paper on "Evidences of a Deep Level in the Kalgoorlie District," and therein expressed the opinion that certain graphitic slates in the Boulder North Extended mine at 240 ft. were the result of a filling-in of a cavity by alluvial deposits, and that subsequent lateral pressure had given the alluvial detritus a laminated structure.

I could not agree with him on the evidence adduced, and as a result of my criticism elicited that he had discovered certain fossils in these beds, which he regarded as conclusive evidence in support of his theory.

I subsequently in company with Mr. Bethune visited the mine and saw the only section available, and in this communication I propose to describe the geological features which are visible, and to discuss the nature and origin of the so-called fossils.

The shaft of the Boulder North Extended being close-timbered all the way, and the only open ground available for inspection being in the east and north crosscuts, I have had to rely a good deal on hearsay evidence for certain data.

Virtually, the whole of the way after the surface alluvium (by the miners called "made ground") had been passed through, the shaft was sunk in pink and white clay slates. At about 80 feet water was met with, and at 200 feet crosscuts were opened out N.E. and S.W., that is, at right angles to the general strike of the auriferous lodes in the Kalgoorlie district.

The west crosscut passed through about 12 feet of fairly hard clay-slates, almost vertical but with a slight underlay to the west. Several veins of ferruginous quartz were cut in the clay-slates; then a mass of decomposed rock was entered (which from its general appearance, kaolinitic nature and presence of "soapy heads" I take to be a porphyry) and continued to the head of the cross-cut at 50 feet, being occasionally traversed by vertical clay-slates, though not so defined as near the shaft.

On the east side, the foot wall of the clay-slates is noticed at about four or five feet in from the shaft, giving a total width of

20 ft. to the first series of clay-slates. This foot wall (?) carries a very hard band of ferruginous quartzite, about 10 ft. wide. Immediately beyond this vein an intensely hard diorite was met with. The crosscut was only driven about 15 ft. at the time of my visit, as it was intended to continue the shaft and to crosscut at a deeper level.

The bottom of the shaft was so wet that I could not see any of the features there, but I critically examined the stuff sent up from this position, and secured from it various specimens of the so-called fossils. These occur both in the semidecomposed rock and in a true graphitic slate, so that evidently the clay-slates have changed at some depth below 200 ft. to graphitic slates, and, according to Mr. Bethune, this change took place gradually at a depth of about 200 ft.

The specimens which Mr. Bethune regarded as fossils, I at first thought they were so; that one was the cast of a *Unio*, another of a *Rhynchonella*, and so on. Hence I considered that the diorite on the east side was the result of a flow over horizontal beds, represented now by the vertical clay-slates. But on going below and studying the section I changed my views, especially when I remembered that the graphitic schists at the Queen Margaret mine carried similar pyritous nodules, only they are for the most part spherical. I am now of the opinion that the clay-slates and graphitic slates are examples of contact-metamorphism.

I imagine that the diorite on the east side is an intrusive mass and found a partial vent in a fissure in the porphyry on the west side. The result of the intense pressure would be to cause the slaty structure assumed by the metamorphosed porphyry. The volatile hydrocarbons escaping from below, contemporaneous with diorite-intrusion, could easily supply the necessary carbon to render the slates graphitic. Surface oxidation would remove the graphitic matter above the water-level. The pseudo-fossils would be present before the intrusion of the diorite, and had at that time probably a spherical form. The upward and lateral pressures will account for the more or less elongated and flattened form which they now present.

The origin of the ferruginous quartzite bands I explain as follows:—The diorite and also the contact-metamorphosed rock on cooling would naturally contract and thus would cause fissures more or less irregular, which by deposition of silica and iron-salts from solution in percolating waters would be in course of time completely filled. Could one critically examine the locus of the pseudo-fossils, and should they be found to lie in a vertical plane, then my view would receive considerable support.

Discussion.

Professor Tate was not satisfied as to the evidence of contact-metamorphism submitted by the author, or to that of alluvial deposition contended for by Mr. Bethune. He considered that those phenomena were explainable by the diminishing effects of disintegration in depth upon the same rock. The shapes of the pyritous bodies could not, in his opinion, be referred to bivalved molluscan casts.

Mr. J. G. O. Tepper, F.L.S., remarking on the acute edges of the supposed fossils, said that the figure could not be due to lateral pressure, otherwise the edges would be perpendicular to the diameter as in ordinary discs, or at least a very blunt rounding off. The objects could not be compressed nodules, in his opinion, and that they were of organic origin was a view receiving some support from the great development of graphite associated with them in the containing rock. Graphite in rock-formations had long been claimed to have been derived from organic matter, since no other satisfactory theory to account for the isolation of the carbon had been advanced.

Mr. W. Howchin, F.G.S., considered that in view of the "augen" structure so often produced in metamorphic rocks, the argument that the flattened shape was not due to pressure could scarcely be applied. A fuller knowledge of the actual local conditions and constitution of the rocks was required to make generalizations safe.

Mr. J. J. East, F.G.S., speaking from personal knowledge of the Kalgoorlie field, stated that the occurrences cited were in no way peculiar to the locality dealt with by Mr. Corbin. In the Queen Margaret mine at Bulong the same kind of thing was common. Where the graphite occurred plentifully the miners sought to get beyond it as quickly as possible, for, though seldom unassociated with gold, it rarely formed the matrix of good ore. The rocks of Kalgoorlie form a low range of ferro-magnesian silicates of diabasic character, which were broken up by intrusive dykes of diorite and porphyry. The diorite-dykes seem to be the dominant feature, and extend for miles in thin and thick bosses, alternating along the line of direction in such manner that a plan of them would suggest the figure of a huge cable. Each "link" forms a boss, and along the sides of the "link" the richest gold veins occur in the contact-zone. The graphitic belt is well marked in places, and its connection with the gold-deposit is evident. He regarded the graphite as having been derived from the breaking up of liquid carbonic acid contained in inclosures in the rocks, and by its agency the gold was precipitated from the waters holding it in solution. The nature of these waters we could only guess

at now. They had, however, developed kaolinization of the silicates to an amazing extent, and the iron-constituent had been completely peroxidised to red hæmatite. The hæmatite was everywhere finely disseminated throughout the kaolin. In the contact-zones the hæmatite was hydrated to limonite, and a little free silica in granular form, resembling quartzite, also occurred. In depth pyrites were plentiful, and much of the free gold was replaced by gold combined with tellurium. The porphyry-dyke cited by the author appeared to be genuinely obtrusive, as it cut off all the transverse veins it met. Kaolinization was greatly advanced and had spread to the greenstone rock alongside. It is between the dyke and the greenstone that a schistose structure has been developed by pressure and shearing-strain, but the number of secondary minerals is surprisingly few; colloid silica and limonite, forming the so-called "jasper" reefs, constitute the lode veinstone proper, but its development is quite local. In fact, the bulk of the paramorphism would seem to have been a rapid passage of the greenstone to the stage of kaolin and chlorite. A swelling of the rock in consequence developed the jointings which now furnish the "soapy heads" of the author. Where such a paucity of secondary minerals has been developed, it is much more likely that they should aggregate into colonies or kernels than that they should occur minutely disseminated. To his mind the *lusus naturæ* of the writer were but nodules of secondary origin, and principally of the class termed "spear" pyrites, a variety which rapidly decomposes in contact with air or rain-waters. Wad and pyrolusite also plentifully occur along the graphito-pyritic belt. The pyrolusite is usually well crystallised, and is at times associated with very rich ore.

On a New Myoporum From South Australia.

By J. H. Maiden, Hon. Memb., and E. Betche.

[Read July 5, 1898.]

Myoporum refractum, *n. sp.*

A glabrous shrub somewhat prostrate, attaining a height of 3 feet, but usually only $1\frac{1}{2}$ to 2 feet high as seen, with terete branches amply covered with resinous tubercles. Leaves alternate, crowded, oblong, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, very obtuse, entire or occasionally slightly crenulate, thick or somewhat succulent, sessile and refracted. Flowers usually solitary (sometimes two) in the axils, on slender pedicels shorter than the leaves. Calyx divided to the base, the segments broad and acute, imbricate at the base, about three lines long. Corolla white or often with small purplish dots on the inside of the lobes; glabrous inside, the lobes shorter than the tube. Stamens generally 4 (sometimes 5) exserted but rather shorter than the lobes. Ovarium and fruit 2-celled, not compressed. Fruit small, apparently only slightly succulent, ovoid tapering to the persistent base of the style. Colour of the thin pericarp cream or yellowish. Fifteen miles north of Mount Distance, S.A. (on very salty, mineralised damp soil—a salt-lake, now dry), M. Koch.

The specific name is in allusion to the set of the leaves. This is distinctly an ornamental species, worthy of cultivation.

In affinity it is nearest allied to *M. brevipes*, Benth., also a South Australian desert species, from which it is chiefly distinguished by the refracted leaves, the broad calyx-segments, and the shape of the fruit. The flowers seem to be remarkably variable, not only in the number of stamens, but also in the colour and perhaps in the hairiness of the corolla. All corollas we examined were perfectly glabrous inside, but as Mr. Koch describes the corolla in his notes as "bearded inside" it seems to be probable that both forms exist.

On Two New Cretaceous Bivalves.

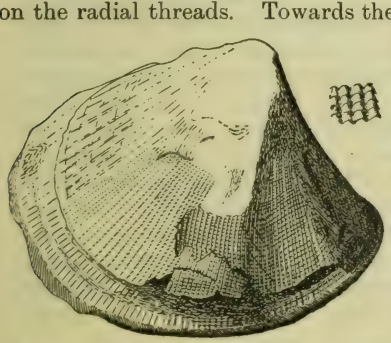
By Professor Ralph Tate.

[Read August 2, 1898.]

Lucina (?) Bonythoni, *sp. nov.* (1898).

Shell large, triangularly oval, with depressedly convex (right) valve. Umbo a little in front of the middle, moderately large, incurved in a transverse direction; lunule almost obsolete. Posterior and anterior dorsal slopes making an angle of 110°; the posterior one straight, the anterior one slightly incurved, and shortly and bluntly extended at its junction with the semi-circular ventral margin, the post-ventral margin rounded.

The ornamentation consists of acutely-rounded radial threads and concentric thread-like lamellæ, forming by their combination a cancellated surface-structure of oblong or nearly square depressions, which extends over the whole surface. The thread-like margins of the concentric lamellæ are feebly vaulted on the radial threads. Towards the ventral margin in the medial line, there are about eight radial threads, and about nine concentric threadlets in a square of 5 millimetres.



Dimensions.— Antero-posterior diameter 4·5; ventro-umbonal diameter 4·0; post-dorsal and antero-dorsal slopes about 2·5 mm.

Habitat.—One right valve, the test of which is replaced by Precious Opal. Upper Cretaceous at White Cliffs, New South Wales; the unique type in the Museum of the School of Mines at Adelaide.

The species-name is in compliment to Sir J. Langdon Bonython, Chairman of the Council of the School of Mines since 1890.

Remarks.—The only shells figured from Australian Cretaceous rocks at all comparable with the present species, apart from any presumptive generic affinity, are *Lucina anomala* and *L.? australis*, Moore, in Quart. Journ. Geol. Soc., xxvi, 1870; more so

with the former than the latter. But *L. anomala* is suborbicular in shape, with a nearly straight dorsal line, whilst my species is triangularly oval or somewhat axiniform in marginal outline, and has a strong tessellated ornamentation. The Syrian Cretaceous species, *L. percancellata*, Whitfield, Bull. Mus. Nat. Hist., iii, p. 403, t.b, f.b, 1891, has a somewhat similar cancellate ornament, but that fossil is nearly circular in outline.

Until the interior is known, the generic location of *L. Bonythoni* will remain uncertain, though the shape and ornamentation are not incompatible with a reference to *Lucina*, but, on the other hand, the transverse direction of the umbonal incurvature may imply other affinities, if other than a mere specific characteristic.

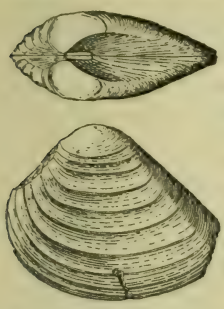
The distinguishing features of *L. Bonythoni* are :—The axial direction of the umbo, the axiniform shape, the cancellate surface-ornamentation (particularly the frilled edge of the concentric growth-lines).

Platopis (?) corrugata, *sp. nov.* (1898).

The fossil under observation is not like any figured species belonging to the Cretaceous fauna of Australia, though it has some resemblance to certain species of so-called *Cytherea*, but yet is more *Astarte*-like than they are. The interior is unknown, and, therefore, the generic relations are extremely dubious. Nevertheless, one exterior feature will narrow the arena of comparison, that is the possession of an erect exsert ligamental plate to each valve, as in *Psammobia* and other Tellinids, and thus indicates an external ligament. Among the genera presenting this character, *Platopis*, Whitfield, Bull, Mus. Nat. Hist., iii., p. 399, 1891, seems to include the main external features presented by the Australian shell. *Platopis*, which is placed by its describer in Astartidæ, contains species which "externally somewhat resemble shells of the genus *Astarte*," the hinge dentition differs from *Opis* and *Opiosma* ; they have a "flattened or depressed convex form," and "possess an abruptly flattened, or even depressed slope, which in many is sharply flattened, or even depressed between the umbonal angles, and the very ill-defined, although large-sized, lunule."

Shell transversely triangular, somewhat cuneiform, convexedly depressed. Umbones large, obtuse, antemedian ; lunule ill-defined. The dorsal slopes straight, inclined at an angle of 95°, the posterior considerably the longer ; post-ventral extremity roundly-pointed (the shell is deficient in this region), the ventral margin nearly straight to beyond the middle line, thence curving rapidly upwards to form the well-rounded anterior extremity. The post-dorsal line is bounded by a narrow declinous lanceolate

area and delimited on its inner aspect by an ill-defined obtuse ridge extending from the umbo to the post-ventral extremity.



The inner margin of the valves is smooth (at any rate visually so) at post-ventral extremity. The ornamentation consists of subacute concentric undulations of variable strength and at variable distances, separated by shallow concave spaces wider than the ridges; coincident with the undulations are widely-separated linear growth-lines; the concentric undulations are continued beyond the post-umbonal ridge as close-set growth-lines.

Dimensions.—Umbonal-ventral diameter, 18; antero-posterior diameter, 22 (by estimate); transverse diameter, greatest at about one-third from the unbo, 9 mm.

Habitat.—One specimen of two valves in apposition, the test replaced by Precious Opal; the interior matrix not opalized. Upper Cretaceous at White Cliffs, New South Wales; the unique type in the Museum of the School of Mines, Adelaide.

On Some Australian Species of Eulimidæ and Pyramidellidæ.

By Professor R. Tate.

[Read August 2, 1898.]

Plate IV, Figures 1-7.

Family Eulimidæ.

Genus Eulma.

(a). *Shell straight.*

1. **E. augur**, *Angas*, Proc. Zool. Soc., 1865, p. 56; Reeve, Icon. Conch., t. f., 1866; Tryon, Man. Conch., vol. viii., p. 269, t. 68, f. 10, 1886.

Synonym, *E. proxima*, Sowerby in Reeve's Icon. Conch., t. 6, f. 48, 1866; Tryon, op. cit., t. 68, f. 11.

I have compared the types of *E. augur* and *E. proxima* in the British Museum, and the only differences between them (*E. proxima* is slightly immature) are those of total length, the former having 10 whorls in a length of 12 m.m., and the latter 12 whorls in a length of 15 m.m., and a slight difference in the proportion of the length to the breadth. An examination of many examples of *E. augur* proves that the proportion of length to breadth is not constant, and that micromorphs occur; indeed there is a great tendency among Eulimidæ to range from giant to dwarf-sizes; thus two extremes give the following ratio, 100 to 36 and 100 to 28 vix.

Tryon's figure of *E. augur* grossly misrepresents its shape, some individuals may show a barely perceptible torsion of the spire, but in general, Angas' diagnosis "marginibus spiræ rectioribus" is applicable.

Distribution.—For *E. augur*. South Australia (without locality), *Angas*, type specimen; Holdfast, Aldinga, and Fowler's Bays, Wauraultie and Wallaroo, Spencer Gulf, *Tate*,; Royston Head (Matthews!)

Tasmania (coll. Dr. Verco!)

For *E. proxima*. New South Wales, Port Jackson (type). The record for Tasmania of *E. proxima* by Tenison-Woods is based on an erroneous determination, the shell so-named is *Rissoina spirata*.

2. **E. orthopleura**, *sp. nov.* Pl. iv., fig. 1.

Pyramidal, straight, opaque-white, shining; whorls, nine, flat; last whorl subangular at the periphery, aperture rhomboidal.

Length, 6·25; width, 2·25.

Affinities.— This new species resembles *E. polygyra*, H. Adams (type compared), but it has a blunter apex, and the aperture is of a different shape. The rhomboidal aperture differentiates it from *E. polygyra* and *E. augur*, and in addition is is distinguishable from the latter by a subangular base.

Localities.—South Australia ; Holdfast and Aldinga Bays (*R. Tate*, many examples).

(b) *Shell tortuous.*

In the following descriptions I have employed the phrase "torsion in one or two directions," that is lateral or vertical, or both. Hitherto the torsion has been described as either to the left or right, upwards or backwards ; but as these positions are relative to the aperture, it is obvious that if the spire be inclined to the left at a given stage of growth, the addition of a half-turn to the body-whorl will bring the torsion to the right. The same change will happen when the torsion is in a vertical plane : at one stage, if the inclination be forwards, it becomes backwards with the increase of a half-turn.

The application of the terms expressive of the direction of the torsion can only be absolute as to the plane of the twist, that is whether vertical or lateral. It is only possible to extend their application when growth of the shell shall have ceased, or if the shell-growths be periodic and of one or more complete turns. This latter condition is certainly presented by *E. Tenisoni*, as pointed out to me by Dr. Verco, as traces of periodic growths are visible on the spire, and in alignment on the one side. But there are no distinctive features by which to recognise an adult Eulimid.

3. E. Tenisoni, *Tryon*, Man. Conch., vol. VIII., 1886, p. 269, t. 68, f. 16.

E. micans, Tenison-Woods, Proc. Roy. Soc., Tasmania, for 1875, p. 144 (1876), non Carpenter.

The early spire-whorls are very narrow, and impart to the adult shell an almost mucronate termination. The apical whorl is blunt, higher than wide, but it cannot be described as mamillated.

The shell attains to a length of 6 mm., and width of 2·5 mm.; the spire-whorls nine in number ; the torsion of the spire is in two directions ; aperture roundly oval.

This species makes a near approach to *E. brevis*, Sow. (with the type of which I have made comparison), but the shell is more tortuous, and the body-whorl more depressed.

Distribution.—Tasmania (*Ten.-Woods*, type) ; Victoria ! ; South Australia, Holdfast, Aldinga, Streaky, and Fowler Bays, Wauraultie, Spencer Gulf (*R. Tate*, many exs.).

4. E. commensalis, *sp. nov.* Pl. iv., fig. 2.

Shell elongate-pyramidal, strongly curved in two directions, translucent, vitreous, fawn-coloured with contained animal; whorls ten, moderately convex; body-whorl globosely inflated, thence rapidly tapering to the acute apex; aperture semi-circular; outer lip much ecurved medially; the front of the aperture is well-rounded, but the margin is slightly reflected, so that seen from behind there is the semblance of basal constriction. Long., 5; lat., 2 mm.

Habitat and Localities.—Commensal with *Amblypneustes*, spp., Holdfast and Aldinga Bays (*R. Tate*, many exs.); Port Stephens, N.S.W. (Aust. Mus. !).

Affinities.—From figures and description, this species resembles *E. parva*, Sowerby, but seems to differ by its more ventricose body-whorl and semi-circular aperture.

5. E. indiscreta, *sp. nov.* Pl. iv., fig. 3.

Shell elongate-pyramidal, slightly curved in two directions, translucent, vitreous, colourless. Whorls eight, nearly flat, of regular increase; apex acute; base convex and attenuate at the front; aperture narrowly oval; outer lip much curved medially.

Long., 4·25; lat., 1·5; long. of aperture, 1·5.

Locality.—Shell-sand, Holdfast Bay (*R. Tate*, one ex.); Frederick Henry Bay, Tasmania (*W. L. May !*); Port Stephens, N.S.W. (Aust. Mus. !).

Not much unlike *E. commensalis*, but the whorls are much flatter and the aperture of a different shape. From figures and description this shell has an analogue in the European *E. incurva*, but the aperture appears to be proportionately less elongate in the Australian shell. *E. Petterdi*, Beddome, must be a near ally; it is diagnosed as follows :—"Shining white, curved; apex rounded; whorls 10; aperture narrowly pyriform; lip scarcely reflected; columella straight. Long., 4; lat., 1; apert., 1 m."

FAMILY PYRAMIDELLIDÆ.

Genus Eulimella.

Of the diagnostically-known Australian species of this genus, five species are recorded from North Australia in the "Challenger Mollusca," and two others from New South Wales — *E. moniliformis*, Hedley, and *E. pulchra*, Brazier. In South Australian waters there occur two species, viz. :—

1. **E. moniliformis**, *Hedley*, P.L.S., N.S.W., 1891, p. 247, t. 19, figs. 1-3.

Holdfast Bay, in shell-sand *(R.T.)*.

2. E. tricincta, *sp. nov.* Pl. iv., fig. 4.

Shell small, elongately conical, pellucid-white; apex heterostrophe. Spire-whorls six, somewhat convex, the anterior whorl margining the suture, sculptured by three engraved spiral lines, one median and one near to each suture. Last whorl regularly convex and moderately attenuated at the base. Aperture pyriform; outer lip straight and thin; columella arched, there is no indication of a plait or tooth.

Length, 5·5; breadth, 1·75 mm.

Has somewhat the aspect of *Syrnola jucunda*, but apart from the different generic characters, the shell is narrower and the last whorl proportionately much longer.

Localities.—Streaky and Fowler Bays, in shell-sand *(R.T.)*.

GENUS ODONTOSTOMIA.

1. Odontostomia (Syrnola) infrasulcata, *sp. nov.* Pl. iv., fig. 5.

Shell narrow-lanceolate, about four times as long as wide, shining, white, feebly striated in an axial direction. Apex heterostrophe. Spire-whorls nine, flat, suture linear. Body-whorl imperforate, subangulate at the periphery, below which are about six revolving incised lines, the posterior one a little in front of the posterior angle of the aperture. Aperture narrow-oval; columella-plait very prominent, in front of which the inner lip is effusively expanded, and its margin reflected; outer lip not ribbed within.

A specimen in Dr. Verco's collection has two sulci on the last whorl above the periphery, one of which is continued submedially on the spire-whorls.

Length, 11; breadth, 3·5 mm.

Localities.—Holdfast Bay, St. Vincent Gulf, and Waurailtie, Spencer Gulf, in shell-sand (*R.T.*). Dredged off Rapid Head in 10 to 12 fathoms by Dr. Verco.

Affinities.—This new species is conspicuous by its elongate-oval aperture, effuse at the front and the sulci on the base of the body-whorl. It seems to have no near ally among figured species, though *S. gracillima* is a micromorph of it as regards shape.

Supplemental Note. — The annexed figure of *O.* (*Syrnola*) *Jonesiana*, described in Part I of the present volume, p. 70, is added for comparison with the present species, between which there are great resemblances.

2. Odontostomia (Pyrgulina) Mayii, *sp. nov.* Pl. iv., fig. 6

Shell conoidally turreted, relatively solid, dull white. Whorls five (excl. the heterostrophe apex), separated by a deeply and broadly channelled suture; ornamented by rounded obliquely axial ribs wider than the interspaces, which are not visibly sculptured. Last whorl with about 20 axial ribs, which terminate at a spiral groove on the periphery; base somewhat flattened and radially ridged, defined by a spiral rib, which margins the peripheral groove. Aperture oval, outer and inner margins joined by a callus, columella-plait stout, almost parietal.

Length, 2·5; breadth, 1·0 mm.

Localities.— D'Entrecastreaux Channel, Tasmania, whence type-specimen in my collection received from Mr. W. T. May, after whom the species is named.

Remarks.—There are several European species of this type of ornamentation presented by *O. Mayii*, such as *O. turbonilloides*, and one Australian species, *O. Henni*, Brazier. From the latter this new species differs (judging by description and figure) by its channelled suture, oblique and stout ribs, and ribbed base.

Genus Turbonilla.

Turbonilla erubescens, *Tate.*

1877. *Elusa bifasciata*, Tenison-Woods, Proc. Roy. Soc., Tasm., for 1876, p. 150; non *Turbonilla bifasciata*, A. Adams, 1861.

1877. *Turbonilla festiva*, Angas, Proc. Zool. Soc., p. 35, t. 5, f. 4; non Folin, 1867.

1879. *Turbonilla erubescens*, Tate, Trans. Roy. Soc., S. Aust., ii., p. 138, t. 5, f. 10.

The types which served for the definitions of the forenamed shells are from Tasmania, New South Wales, and West Australia (King George Sound). Mr. May is satisfied, as the result of comparison of authentic specimens, that the first two are one and the same; I have arrived at a like result in respect of the Tasmanian and West Australian shells. At the time of my definition of *T. erubescens*, my knowledge of *T. festiva* was restricted to the published description and figure; but now, with actual specimens before me, I find that the alleged differences prove to be invalid. The question remains as to which of the three names should be employed; as indicated in the above synonymic schedule *bifasciata* and *festiva* have prior use in the genus over their Australian applications, this leaves *erubescens* free to be employed.

The species is also known to me from South Australia and Victoria.

Turbonilla Beddomei, *Petterd, sp.*

1884. *Chemnitzia Beddomei*, Petterd, Jour. Conch., p. 136.

1892. *Turbonilla crenulifera*, Tate, Trans. Roy. Soc., S. Aust., xv., p 126, t. 1, f. 2.

The specimens, attributed to Petterd's species, given me by Mr. May, leave no doubt of the identity of my shell therewith, though the diagnosis of the Tasmanian shell does not refer to the tendency of decresence of the costæ on the anterior aspect of the whorls, and to crenulation at the posterior suture.

So far as known to me, the species is restricted to South Australia and Tasmania.

Turbonilla varicifera, *Tate*, 1898. Pl. iv., fig. 7.

Shell elongate turreted, about four times as long as broad usually of a chestnut-brown colour, with the varices mottled with white, but various shades passing to white occur. Spire-whorls twelve in a length of fifteen millimetres, tipped by a heterostrophe protoconch; flatly convex, but separated by a well-defined suture; ornamented by close-set, slightly oblique, rounded, axial ribs, separated by much narrower interspaces, here and there two or more costæ are confluent to form a broad varix; the whole surface is crossed by incised spiral lines increasing to about fifteen on the penultimate whorl of a large specimen. Last whorl with axial costæ, about twenty, evanescent at the regularly rounded periphery; base spirally linear-sulcate; aperture oblong, columella with an obscure spiral plication.

Long., 15 mm.; lat., 4·00 mm. A micromorph of twelve spire-whorls measures 10 mm. by 2·5 (vix) mm.

This species has been represented in my cabinet for many years by incomplete beach-examples, which indicate a very large shell for the genus and the possession of varices. Its recent discovery in some numbers by Dr. Verco, through dredgings in the deeper parts of St. Vincent and Spencer Gulfs, has, now, made it possible to adequately diagnose the shell.

The feature of the variced spire, though exceptional, is however, presented by the recent species, *T. striatula*, Linne (the type of Montserrato's Section Pyrgostylus) and the Miocene species, *T. intermedia*, Grateloup; both of which I have under observation.

The Australian species, making the third enumeration under *Pyrgostylus*, differs from *T. striatula*, chiefly by its straighter costæ and narrower interspaces; and is distinguishable from *T. intermedia* by slenderness, less oblique ribs with narrower interspaces.

On Some Recent and Fossil Australasian Species of Philobryæ.

By Professor Ralph Tate.

[Read August 2, 1898.]

Plate IV., Figures 8-10.

The bivalved mollusca, which constitute the genus *Philobrya*, are minute shells, which present in their adult state various characters proper to the very young states of *Mytilidæ*, *Aviculidæ*, and *Arcidæ*. They were little known to malacologists till the appearance last year of M. Felix Bernard's "Etudes comparatives sur les genres *Philobrya* et *Hochstetteria*." Bernard has provisionally placed these two genera as a subfamily (*Philobryinæ*) in the family *Aviculidæ*; but the absence of prismatic structure of the test, and the existence of a copious periostracum incline me to the opinion that the systematic position of this subfamily is rather with *Mytilidæ* than with *Aviculidæ*.

Of the eleven species referred by Mr. Bernard to this subfamily, nine occur in the Southern Hemisphere, chiefly in moderately high latitudes. The recognition of the existence of *Philobrya* in Australian waters is, therefore, not unexpected; but greater interest is attached to the fossil record, here announced for the first time, as may be gathered from the following extract from M. Bernard's essay:—"Il est indispensable de rechercher si parmi les formes fossiles il n'en existe aucune qui pourrait soit rentrer dans le genre *Philobrya*, soit s'en rapprocher plus que ne font les Anisomyaires actuels. Je n'ai trouvé aucune indication de cette nature en ce qui concerne les faunes secondaire et tertiare. La cause en est peut-être dans la petitesse de ces coquilles qui peuvent avoir échappé aux investigations, ou bien avoir été considérées par ceux qui les ont recueillies comme des jeunes ou de petites espèces d'Aviculidés, de Mytilidés ou même de *Lima*. Les fossiles primaires m'ont fourni quelques indications qui, tout en manquant pour le moment de precision, me paraissent devoir soulever une utile discussion." Journ. de Conch., No. 1, 1897, p. 41.

The additional species—subjects of the following records are:—Two living in Southern Australia and Tasmania, one from the Newer Tertiary of New Zealand, and two from the Older Tertiary of Victoria.

Philobrya crenulatifera, *Tate.*

Myrina crenatulifera, Tate, Trans. Roy. Soc., S. Australia 1892, p. 131, t.1, figs. 11 and 11a.

This shell has all the interior characters proper to *Philobrya*, but its inflated umbo is crowned by a subcircular (not calyculate) prodissoconch which does not interrupt the convexity of the umbo. The absence of costæ further suggests a reference to *Hochstetteria*, but the elongate ligamental pit and almost terminal umbo are, however, not in agreement thereto.

In addition to the South Australia locality of the type, specimens from two Victorian localities have been submitted to me. Barwon Heads, *Mr. T. S. Hall*; Flinders Island, *Mr. G. B. Pritchard.*

Philobrya fimbriata, *sp. nov.* Pl. iv., fig. 8.

Shell thick, ventricose, contour obliquely subquadrangular, umbos terminal. Prodissoconch relatively small, though prominent, semicircular, its outer margin defined by an elevated rim. Anterior margin of valve inclined at an angle of from 60° to 70° to the dorsal margin; surface ornamented with about fourteen feeble angular radial ribs, crossed by regularly disposed concentric threads (not so strong as the radial ones), which form imbricating serratures at the intercrossing. Test covered with a tawny subpellucid epidermis, which is raised into setæ on the radial costæ (corresponding with the serratures thereon), and extends as a fringe around the ventral margin of the shell.

Ligamental pit lanceolate, directed obliquely backwards for one-third or one-half-length of the posterior hinge-line. The transverse crenulations on the posterior of the hinge-line are reduced to short crowded striæ.

Dimensions of a large example.—Ant. post. diameter, 3·75; dorso-ventral diameter, 4·5; thickness, 3 mm.; but the average size is about three by four.

Habitats.—Tasmania, Derwent and Frederick Henry Bay, coll. Mr. May; South Australia in dredge-siftings from St. Vincent and Spencer Gulfs—dead shells numerous, living examples few, coll. Dr. Joseph Verco.

Victoria, among *Kellia rostulata*, Tate, dredged in life, seven to nine fathoms at Port Phillip Heads by the late Mr. J. B. Wilson (my collection).

Philobrya trigonopsis, *Hutton, sp.*

Mytilicardia trigonopsis, Hutton, Trans. New Zealand Institute, vol. xvii., p. 324, 1885; *id.*, "Macleay Memorial Volume," p. 85, t. 9, f. 94 a-b, 1893.

Habitats.—Wanganui (Pliocene) and Petane (Miocene), New Zealand.

The above emended generic reference is based on the study of cotypes kindly transmitted to me by the author of the species. It closely resembles *P. costata*, but which has thicker and closer ribs.

Philobrya Bernardi, *sp. nov.* Pl. iv., fig. 10.

Shell rather thin, ventricose, contour obliquely subquadrangular; umbones nearly terminal, prodissoconch large and prominent. Anterior margin nearly straight, or slightly curved, making a right angle with the hinge-line; posterior margin straight, ventral-margin well-arched. An obsolete keel defines a somewhat steeply inclined post-umbonal slope; anterior to which the surface is ornamented by about eight slender costæ, which are crossed by concentric threads of nearly equal calibre with the radial threads, regularly disposed, but with increasing intervals towards the ventral margin; these concentric threads produce slight serratures on the radial threads.

Internally, the posterior margin is slightly interrupted by five or six crenulations. The ligamental pit is short, lanceolate, and directed backwards; posterior to which the hinge-line is obsoletely transversly ridged. A very deep byssal notch terminates the almost obsolete anterior of the hinge-line.

This new species is named in compliment to M. Felix Bernard,* of the Natural History Museum at Paris, whose gift of specimens of *P. costata* has largely assisted me in the elaboration of the species herein dealt with. It is conspicuous among congeners by open fenestrated ornament.

Horizon.—Eocene, Victoria; Muddy Creek (2 exs.), Shelford (1 ex.), Curlewis (1 ex.), collected by J. Dennant; and Fyansford (1 ex.), collected by J. F. Mulder.

Philobrya prænuntia, *sp. nov.* Pl. iv., fig. 9.

Shell rather thin, ventricose, inequilateral; obliquely oval-rhomboid in contour; prodissoconch relatively very large and prominent.

The anterior margin is convex. The ornament consists of about twelve slender radial costæ, on which are formed slight serratures by the very feeble concentric laminations which are visible in the interradial spaces.

The ligamental pit is shortly oval-lanceolate and directed backwards; the anterior portion of the hinge-line has about fourteen transverse ridges, whilst the posterior portion is only obsoletely ridged.

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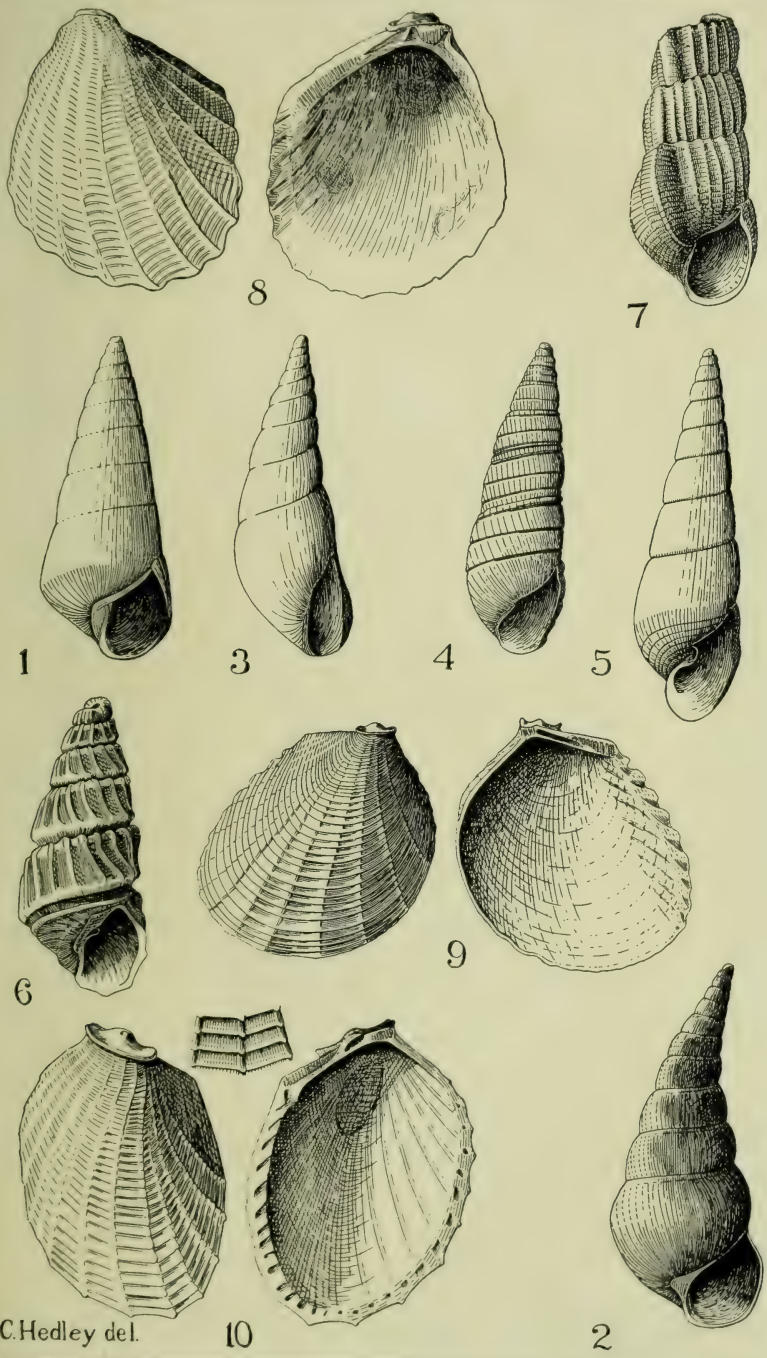
* It is with profound regret that I announce this dedication to be posthumous, as that talented young malacologist died August 12, 1898, at the early age of thirty-five years.


8
7
1
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C.Hedley del.

This species has some resemblance to *P. Filholi*, but is less inequilateral, and the costæ are more numerous and slender. Its most striking feature is the relatively wide anterior area.

Horizon.—Eocene, Victoria, at Cape Otway, one ex. (since lost) collected by J. Dennant.

LIST OF DESCRIBED SPECIES OF PHILOBRYA.

(*a*) Recent.

P. setosa, *P. P. Carpenter*, 1864. California.
P. Munieri, *F. Bernard*, 1896. France.
P. atlantica, *Dall*, 1895. Argentine.
P. meridionalis, *E. A. Smith*, 1885 (*Dacrydium*). Prince Edward and Marion Islands.
P. aviculoides, *Velain*, 1876. Isle St. Paul.
P. meleagrina, *Bernard*, 1896. Stewart Island, N.Z.
P. costata, *Bernard*, 1896. Stewart Island, N.Z.
P. Filholi, *Bernard*, 1897. Stewart Island, N.Z.
P. crenatulifera, *Tate*, 1892 (*Myrina*). S. Australia and Victoria.
P. fimbriata, *Tate*, 1898. S. Australia and Tasmania.
P. (Hochstetteria) crenella, *Velain*, 1876. Isles St. Paul and Amsterdam.
P. (Hochstetteria) modiolina, *Velain*, 1876. Isles St. Paul and Amsterdam.
P. (Hochstetteria) trapezina, *Bernard*, 1897. Stewart Island.

(*b*) Fossil.

P. trigonopsis, *Hutton*, 1885 (*Mytilicardia*). Pliocene and Miocene, N. Zealand.
P. Bernardi, *Tate*, 1898. Eocene, Victoria.
P. prænuntia, *Tate*, 1898. Eocene, Victoria.

EXPLANATION TO PLATE IV.

[All the figures considerably enlarged.]

1. Eulima orthopleura, *Tate*, 1898.
2. Eulima commensalis, *Tate*, 1898.
3. Eulima indiscreta, *Tate*, 1898.
4. Eulimella tricincta, *Tate*, 1898.
5. Odontostomia infrasulcata, *Tate*, 1898.
6. Odontostomia Mayii, *Tate*, 1898.
7. Turbonilla varicifera, *Tate*, 1898.
8. Philobrya fimbriata, *Tate*, 1898.
9. Philobrya prænuntia, *Tate*, 1898.
10. Philobrya Bernardi, *Tate*, 1898.

Notes on Australian Lepidoptera.

By A. Jefferis Turner, M.D.

[Read September 6, 1898.]

Plate V.

SYNTOMIDIDÆ.

The great majority of the Australian species of this family are referable to the genus *Hydrusa*. My attention was first called to this group by the difficulty experienced in identifying one of our commonest Brisbane insects, described below under the heading of *Hydrusa aperta*, Walk. Fortunately, nearly all the types of the species described by Mr. Meyrick (Proc. Linn. Soc., N.S.W., 1886, p. 773) are contained in local collections. During a recent short stay in Sydney, I took the opportunity of carefully examining those in the Macleay and Australian Museums, and comparing them with my own examples; and I must express my gratitude to the Curators of these museums for their kind assistance. I am also much indebted to Dr. T. P. Lucas for an opportunity of examining types in his valuable collection, and to the Queensland Museum for the loan of specimens.

The difficulty of determining the species of this genus lies in the great uniformity of marking, combined with the considerable range of variability in certain species. For this reason they cannot be satisfactorily studied from isolated museum specimens, but need large series of specimens from various localities for comparison. Series bred from the larvæ would be specially valuable. Mr. Meyrick has, I believe, in spite of the thoroughness and accuracy of his work, been misled in at least one instance into making several species out of one by the paucity of his material.

I do not regard the present contribution as in any way final, for much remains to be learnt of the species inhabiting Northern Queensland, where the genus is most abundantly represented. Of many species, I have seen only a few isolated types; and of those enumerated below, some may, I think, be regarded as perfectly well-established and distinct species: — *Hydrusa humeralis*, Butl.; *H. xanthosoma*, Turn.; *H. ecliptis*, Meyr.; *H. stelotis*, Meyr.; *H. pyrrhodera*, Meyr.; *H. leucacma*, Meyr.; *H. aperta*, Walk.; *H. orphnæa*, Turn.; *H. recedens*, Luc.; *H. annulata*, F.; *H. phepsalotis*, Meyr.; *H. bicolor*, Walk.

The following I regard as species concerning which further information is required, although the majority at least are likely

to stand :—*H. sphenophora*, Turn. ; *H. chlorometis*, Meyr. ; *H. hyalota*, Meyr. ; *H. cyanura*, Meyr. ; *H. antitheta*, Meyr. ; *H. humeralis*, Butl. ; *H. eschatias*, Meyr. ; *H. trigonophora*, Turn.

There are three of Meyrick's species, concerning which, from lack of material, I am unable to form an opinion :—*Hydrusa paraula*, Meyr. ; *H. anepsia*, Meyr. ; *H. macroplaca*, Meyr.

In determining the species, the wing markings are of little value in most instances, as they are both very similar in different species, and variable in the same species. I have followed Meyrick in assuming a normal five spots on the forewings in each instance. A connecting spot between the fourth and fifth is sometimes present. Its full development, so as to unite these two into one large spot, is an important character, but its partial development is valueless, as a small spot in this region is frequently present, or completely absent, in one and the same species. Occasionally the first and third spots are partially confluent as an abnormal variety, but I have never seen them completely merged except in *H. ecliptis* and *H. lampetis*, where they are combined. The white apices to the antennæ of some species is a valuable character, also the presence or absence of yellow or orange spots on the thorax. The thorax is, however, frequently rubbed in imperfect or badly-pinned specimens. The presence or absence of orange on the posterior abdominal segments also furnishes good characters, though a slight extent of variation must here be allowed for.

I have given a complete list of the known Australian species of this family, and have incorporated the localities given in Meyrick's paper. But the section of the *Hydrusa* with black anal segments still remains in an unsatisfactory condition ; *H. leucacma*, Meyr., is a well-defined species ; for the discrimination of the other forms new series of specimens are required.

In Plate V., which is reproduced from a photograph, figures 1 to 6 inclusive and 8 are varieties of *H. aperta*, Walk. ; 7. *H trigonophora*, n. sp.; 9. *H. leucacma*, Meyr. ; 10. *H. orphnœa*, n. sp. ; 11. *H. ecliptis*, Meyr. ; 12. *H. lampetis*, n. sp. ; 13. *H. phepsalotis*, Meyr.; 14. *H. pyrrhodera*, Meyr.

AGAPHTHORA, *Meyrick.*

AGAPHTHORA MELANORA, *Meyr.*

I know of only the type specimens in the Macleay Museum, which are from Cape York, Queensland.

AGAPHTHORA SPHENODES, *Meyr.*

Cairns, Queensland ; Macleay and Queensland Museums.

SYNTOMIS, *Ochsenheimer.*

Tongue well developed. Antennæ in male simple, without serrations, with very short even ciliations ($\frac{1}{5}$). Palpi short,

porrected, loosely scaled. Spurs very short. Forewings with 2 from about $\frac{2}{3}$, 4 and 5 approximated at base, 7 out of 8 below 10; 9, 10, and 11 out of 8. Hindwings with vein 4 absent, 3 and 5 separate at base, 6 absent.

The neuration resembles *Choromeles*, Meyr., but the antennæ are non-pectinated.

Syntomis angustipenna, *Lucas.*

Hydrusa angustipenna, Lucas, Proc. Linn. Soc., N.S.W., 1889.

Male and female, 23-27 mm. Head and face black, collar orange. Antennæ wholly black. Thorax black. Abdomen orange, bases of segments broadly black, two apical segments and anal tuft wholly black. Forewings blackish, spots rather small, semi-transparent, dull orange; basal spot absent; second wedge-shaped, with apex obtuse, anterior; third trapezoidal or triangular; fourth elongate, sometimes surmounted by a small dot; connecting spot absent; fifth roundish, fairly evenly bisected. Hindwings black with a roundish basal orange spot.

In the females the spots are rather larger than in the males. Brisbane.

HYDRUSA, *Walker.*

Tabulation of Species.

1.	Abdomen wholly orange	*xanthosoma*
	Abdomen not wholly orange	2
2.	Forewings wholly black without spots	3
	Forewings with spots present	4
3.	Anal tuft black	*bicolor*
	Anal tuft orange	*eschatias*
4.	Forewings with spots colourless	5
	Forewings with spots more or less orange	6
5.	Thorax with orange spots	*pyrrhodera*
	Thorax wholly black	*hyalota*
6.	Connecting spot between fourth and fifth completely developed (as long as fifth)	7
	Connecting spot absent or only partially developed (less than half fifth)	11
7.	First and third spots wholly confluent	8
	First and third spots separate	9
8.	Spots large, those of hindwings wholly confluent ...	*ecliptis*
	Spots small, those of hindwings touching only	*lampetis*
9.	Patagia partly yellowish	*chlorometis*
	Patagia wholly black	10
10.	Antennæ with apex white	*stelotis*
	Antennæ wholly black	*sphenophora*
11.	Abdomen with last two or three segments wholly black	12
	Abdomen with last two or three segments not wholly black	14
12.	Abdomen wholly black beneath, or with only a few orange scales	*cyanura*
	Abdomen with orange markings beneath	13

13.	Hindwings with basal spot obsolete	*leucacma*
	Hindwings with basal spot well developed	*antitheta*
		paraula
		anepsia
		macroplaca
14.	Antennæ with apex white	15
	Antennæ wholly black	16
15.	Spots small, opaque, deep orange	*phepsalotis*
	Spots moderate, semitransparent	*annulata*
16.	Abdomen hairy	17
	Abdomen smooth-scaled	18
17.	Thorax with yellowish markings	*recedens*
	Thorax wholly black	*orphnea*
18.	Patagia orange	*humeralis*
	Patagia black	19
19.	Distal spot of hindwings triangular, touching basal spot on median vein	*trigonophora*
	Distal spot of hindwings roundish	*aperta*

HYDRUSA XANTHOSOMA, *n. sp.*

Male, 25-28 mm. Antennal pectinations well marked, $1\frac{1}{2}$. Veins 3 and 5 of hindwings closely approximated at base.

Head and face orange. Antennæ fuscous, irrorated dorsally with orange scales. Thorax orange. Abdomen orange without black markings, tuft orange with a few lateral fuscous hairs. Legs orange, anterior and middle tarsi fuscous. Forewings blackish, with confluent orange spots; first spot, small, roundish; second, wedge-shaped; an additional orange streak separated by blackish vein from second spot, and by a narrow black line from costa; third, elongate prolonged upwards and inwards, separated from second only by median vein; fourth, elongate, surmounted by an additional spot; fifth, bisected by a black vein into two equal elongate segments; an elongate connecting spot developed between fourth and fifth; and another between fifth and third; these confluent spots leave two small black areas, first beyond second spot, sometimes confluent with costal and anal black areas; second separating first and third spots. Hindwings orange, hindmargin broadly but irregularly blackish, a small black dot below middle of costa.

Varieties.—The extent of orange suffusion relatively to black ground color varies. The connecting spot between fourth and fifth, usually well developed, may be completely absent.

A very distinct species, remarkable for the absence of black rings on abdomen, and the unusually developed confluent orange markings on wings.

Barrier Range, North-West Australia; some half-dozen specimens, all males (Coll. Macleay), one of which is now in my collection.

HYDRUSA ECLIPTIS, *Meyr.* Pl. v., fig. 11.

Brisbane. One specimen taken by Mr. Illidge. This exactly corresponds with the types in the Macleay collection, which are from Cooktown.

HYDRUSA LAMPETIS, *n. sp.* Pl. v., fig. 12.

Female, 35 mm. Head and face reddish-orange, with a broad black line between antennæ. Antennæ black to apex. Thorax wholly black. Abdomen orange, bases of segments black; two terminal segments wholly black, except anal hairs; beneath wholly black. Forewings dull-blackish fuscous, with a brilliant purple lustre in oblique light; spots small, pale-dull-orange, reddish-tinged, semi-transparent; first coalescing with third to form an elongated oblong spot of moderate size; second small, wedge-shaped; fourth elongate, connected with fifth by an equally large additional spot; fifth bisected unequally, upper segment elongated, lower sub-triangular. Hindwings dull-blackish fuscous with purple lustre; spots pale-orange, semi-transparent; basal spot small, bisecting vein not black; second very small, triangular, touching first.

It is possible that this may be an extreme variety of *H. ecliptis*. The present species is distinguished by the much smaller spots and by the distal spot of hindwing not being completely merged with basal spot.

Bowen, Queensland; one specimen (Coll. Queensland Museum).

HYDRUSA SPHENOPHORA, *n. sp.*

Male and female, 31-36 mm. Head and face orange, with a narrow black line between antennæ. Antennæ black to apex. Thorax black, with a conspicuous posterior orange spot. Abdomen orange, base of segments narrowly fuscous above, more markedly so beneath, apical segment blackish-fuscous, tuft orange. Forewings black with greenish-iridescence, spots moderate or rather large, pale-dull-orange, opaque; first subquadrate, broadly separate from third; second wedge-shaped, apex anterior, obtuse; third irregular oblong, prolonged upwards anteriorly, where it is separated from second only by vein; fourth connected by an additional spot with fifth, the whole forming a broad wedge with apex downwards, separated by veins into four segments, decreasing in size from above downwards, upper three elongate, lowest triangular. Hindwings with spots same colour as forewings, large and confluent; leaving an irregular black line along hind-margin, thickest at apex, toothed below middle; and a black spot below middle of costa.

Allied to *H. ecliptis* and *H. stelotis*. From the former distinguished by separation of first and third spots, from the latter by

black-tipped antennæ, large and confluent spots of hindwings, &c., but more material is necessary to satisfactorily determine the limits of variation of these species. Barrier Range, North-West Australia; two specimens (Coll. Macleay).

HYDRUSA CHLOROMETIS, *Meyr.*

I have not seen a type of this species, but from the description it appears to be very distinct, belonging to the group in which connecting spot between fourth and fifth is fully developed, and characterised by the ochreous-yellow spots on patagia and thorax.

The type specimen was taken by Mr. Meyrick at Glen Innes, New South Wales, in December.

HYDRUSA STELOTIS, *Meyr.*

I have only seen the types, which appear very distinct. Cooktown (Macleay Museum).

HYDRUSA PYRRHODERA *Meyr.* Pl. v., fig. 14.

Thursday Island, Cape York, Cooktown, and Cairns, Queensland. The Queensland Museum contains a large series from the last-named locality.

HYDRUSA HYALOTA, *Meyr.*

Cape York, Queensland; one specimen each in the Macleay collection and that of the Queensland Museum. Fresh specimens are required to establish with certainty its distinctness from the preceding.

HYDRUSA LEUCACMA, *Meyr.* Pl. v., fig. 9.

There are five male specimens of this species in Coll. Lucas. It closely resembles some forms of the following species in the forewings and thorax; but may be readily distinguished by the obsolescence of basal spot of hindwings, and complete blackness of three apical abdominal segments including anal tuft. There are five orange markings on dorsal surface of abdomen of male.

Cairns, Queensland.

HYDRUSA APERTA, *Walk.* Pl. v., figs. 1-6 and 8.

Syntomis aperta, Walk., Suppl. 72, Meyr., l.c., 134.; *Hydrusa pyrocoma*, Meyr., 127; *H. synedra*, Meyr., 128; *H. hesperitis*, Meyr., 129; *H. mochlotis*, Meyr., 132; *H. nesothetis*, Meyr., 133.

The distinguishing features of this species are the large size, 33-48 mm. (but dwarfed specimens also occur), the black antennæ, the broadly orange head, the conspicuous yellow posterior thoracic spot, the seven orange bars on the abdomen of male, six in female (the last two of these may be reduced in size, or nearly obsolete), the very elongate fourth spot of forewings, and the well-developed basal spot of hindwings.

Varieties.—The wing-markings are extremely variable. The sexes are usually easily distinguishable, the males being broader-winged, with smaller and more widely separate spots; in the females the spots are usually larger, more closely approximated (rarely tending to coalesce), and supernumerary spots are often present.

To enter into details — The fourth spot is sometimes surmounted by a small extra spot. The connecting spot between fourth and fifth may be entirely absent, or rudimentary, or well-developed, about half-length or less of upper segment of fifth spot. A small spot resting on second spot is rarely present in the male, frequently in the female. Very rarely first and third spots are partially confluent (one specimen). In hindwings distal spot may be small (especially in males), with upper segment small or absent, or large (especially in females), with upper segment well developed. In the abdomen the orange on the dorsal surface of penultimate and ante-penultimate segments may be reduced to small central dots. Beneath the two ante-apical segments may have the orange fairly well-marked, reduced to a few scattered scales or absent. The anal tuft is always orange.

After careful comparison with the types in the Macleay and Australian Museums, I believe that all Meyrick's names given above are synomyms for one variable species. All the forms occur commonly about Brisbane. At the same time I would freely acknowledge, that if my material had been restricted to Mr. Meyrick's types, I should have regarded them as separate species as he has done.

With regard to *Syntomis aperta*, Walk., I have felt considerable difficulty. Walker's description of the wings I cannot understand, but he says "scutellum" is yellow, which is suggestive of this species. Meyrick describes the thorax as black, but this, I believe, after examining them, to have been due to his types being rubbed. That in Dr. Lucas' collection has a conspicuous posterior yellow spot. Mr. Meyrick describes the antennæ as white at apex, but I cannot help regarding this as an error. Careful inspection of the types named by him *aperta* in the Macleay, Australian Museum, and Lucas' collections shows no more than a doubtful paleness of the terminal joint in one instance, due to loss of scales. These types appear to me to be certainly referable to the common Brisbane species.

If my conclusions be correct, the species has a wide range from the extreme north of Queensland to South Australia. It is very common in the neighbourhood of Brisbane. Mr. R. Illidge finds the larvæ in his garden feeding on various weeds and decaying leaves and fruit they are densely clothed with brown hairs.

HYDRUSA TRIGONOPHORA, *n. sp.* Pl. v., fig. 7.

Male and female, 25-35 mm. It differs from *H. aperta*, Walk., in the smaller size, in the distal spot of hindwings triangular, instead of roundish, the apex of triangle touching basal spot on median vein, and in tuft of male being black laterally. At first, I regarded it as a variety of the preceding; but have now five specimens taken at Brisbane and Stradbrooke Island, and have seen many others, all of which show the differences to be constant.

HYDRUSA CYANURA, *Meyr.*

One specimen (Coll. Lucas); said to be from Thursday Island, Queensland. There is a second specimen in this collection.

HYDRUSA ANTITHETA, *Meyr.*

I saw a type of this species in the Australian Museum, and it seemed to me distinct; distinguished from *H. aperta* by the two apical segments being wholly black. Whether a posterior thoracic spot was present I could not decide. No trace of it is discernible, but the pin goes through where it might have been.

I have received a specimen from Bundaberg, which resembles the type of *H. paraula*, Meyr., in the Macleay Museum. This may or may not be distinct from the foregoing. The posterior spot is very distinct.

I have not seen the types of *H. anepsia*, Meyr., and *H. macroplaca*, Meyr., and can therefore express no opinion on these species.

HYDRUSA HUMERALIS, *Butl.*

(Journ. Linn. Soc., 1876, 352).

Male and female 24-30 mm. Antennal pectination in male rather long (2). Head orange, obscurely fuscous between antennæ. Antennæ black to apex. Thorax black with orange patagia, and a conspicuous posterior orange spot. Abdomen orange, bases of segments broadly blackish; apical segment in male blackish, with a small dorsal orange spot, in female pale orange. Forewings blackish, spots pale orange, opaque, rather small; first, roundish or oval; second, wedge-shaped, apex anterior, obtuse; third, irregular-oblong or sub-triangular; fourth, elongate, sometimes surmounted by an additional dot; connecting spot absent; fifth, roundish or oval, evenly bisected by a black vein. Hindwings black, with spots large and confluent, somewhat constricted at point of union.

Distinguished by long antennal pectinations of male, confluence of spots of hindwings, and especially by the orange patagia.

Barrier Range, North-West Australia; two specimens (Coll. Macleay). The British Museum type is stated to be from North Australia. I have two specimens from Brisbane and Stradbrooke Island, and have seen others, which differ from the types in spots of hindwings being separate; for the present I include them in the present species.

Hydrusa orphnæa, *n. sp.*

Male and female 24-27 mm. Head broadly black on crown, collar yellow. Face black in male, in female mixed with ochreous. Antennæ black to apex. Thorax black. Abdomen with hairy yellow scales, bases of segments black. Forewings black without iridescence, thinly scaled; spots moderate, pale orange, semitransparent; first, small, subquadrate; second, larger, bluntly wedge-shaped; third, nearly triangular, anterior angle produced towards second, and truncate; fourth, elongate, surmounted by a small dot, connecting spot absent; fifth, roundish, bisected by a black vein. Hindwings, basal spot rather larger, irregularly outlined, unequally divided by a fine black vein; distal spot well developed, upper segment nearly as large as lower.

Readily distinguished by the hairy abdomen and the scantily-clothed forewings, which give the species a very distinct appearance. The black face of the male is a very marked character, but may not be constant. The male is broader winged.

Ballandean, Queensland, and Tenterfield, New South Wales, three specimens in February.

Hydrusa annulata, *Fab.*

Zygaena annulata, F.E.S., 389; *Syntomis annulata*, Boisd. Zyg. 122, pl. vii., 8, pl. viii., 2; *Hydrusa cingulata*, Butl., Journ. Linn. Soc. 1876, 352; *H. nigriceps*, ib. 352; *H. intensa*, ib. 353, Meyr. l.c. 136.

The earlier synomymy is taken from Meyrick's paper. I have read Butler's descriptions and do not find in them any tangible points of distinction. His *Hydrusa intensa* is recognised by Meyrick, but the point of distinction given by the latter is untenable. I have taken every gradation from nearly complete absence to considerable development of upper section of distal spot of hindwings on the same day under circumstances which left no doubt as to specific identity.

Varieties.—A very constant form in its markings. In Brisbane the males are slightly larger and broader-winged than the females, in specimens from Ballandean and Tenterfield the disparity is much more marked. The anal tuft of the male, normally wholly orange, is sometimes black at the sides, as in *H. phepsalotis*. In forewings the fourth spot is rarely surmounted

by a small extra spot. I have one female specimen in which the first and third spots, normally widely separate, are confluent.

Brisbane, Stradbrooke Island, and Moreton Bay District generally ; Ballandean, Maryborough, Rockhampton, and Cooktown, Queensland ; Tenterfield, Grafton,Sydney, and Wollongong, New South Wales ; also from Tasmania. Common and generally distributed.

Hydrusa phepsalotis, *Meyr.* Pl. v., fig. 13.

This may be distinguished best from *H. annulata* by the small, intensely orange spots on the wings. The anal tuft, orange, with black sides, is characteristic, but is occasionally found as a variety in the latter species, as is the obsolescence of upper part of basal spot of hindwings.

Var. æthiops. In the Macleay Museum are two specimens from Sydney and Illawarra, in which the spots on the wings are extremely small. In both the distal spots of the hindwings are absent. In one the posterior spots of the forewings are absent, only three minute basal spots being present.

Maryborough and Mount Tambourine, Queensland ; Sydney and Illawarra, New South Wales.

Hydrusa recedens, *Luc.*

(Proc. Linn. Soc., N.S.W., 1891.)

Male, 17 mm. Head and face ochreous-yellow ; a few fuscous scales between antennæ. Antennæ black to apex. Thorax black, with some ochreous-yellow scales posteriorly, patagia fuscous or light-ochreous-yellow. Abdomen with hairy yellow scales, bases of segments black ; seven yellow markings on dorsal surface ; tuft pale-ochreous, at sides fuscous. Forewings black, rather thinly scaled, without iridescence ; spots pale-ochreous, semitransparent ; first and second spots quadrangular ; third triangular ; a well-developed lenticular spot between second and third ; fourth narrow-elongate, surmounted by a faint ochreous line ; connecting spot indicated by a small dot ; fifth spot roundish, evenly bisected. Hindwings with basal spot well developed ; distal moderate, remote, upper segment small.

Immediately distinguished by its small size from all other species. It appears to be variable ; the colour of the patagia differs in the two specimens. The lenticular spot between second and third spots would be a good character if constant. In the hairy abdomen it differs from all except *H. orphnæa.*

Duaringa, Queensland.

Hydrusa eschatias, *Meyr.*

I have only seen the type in the Macleay Museum. The locality is unknown.

HYDRUSA BICOLOR, *Walk.*

Euchromia (Hydrusa) bicolor, Walk., Bomb. 255, Butl. Ill. Het. I. 19, pl. ix. *Hydrusa bicolor*, Meyr., l.c., 139.

Cairns, Queensland, apparently common (Macleay and Queensland Museums). Mr. R. Illidge has taken one specimen at Brisbane.

CHOROMELES, *Meyrick.*

CHOROMELES GEOGRAPHICA, *Meyr.*

Taken commonly about Brisbane in October and again in March.

CHOROMELES STREPSIMERIS, *Meyr.*

I have seen only the type in the Macleay Museum ; it is from Bowen, Queensland.

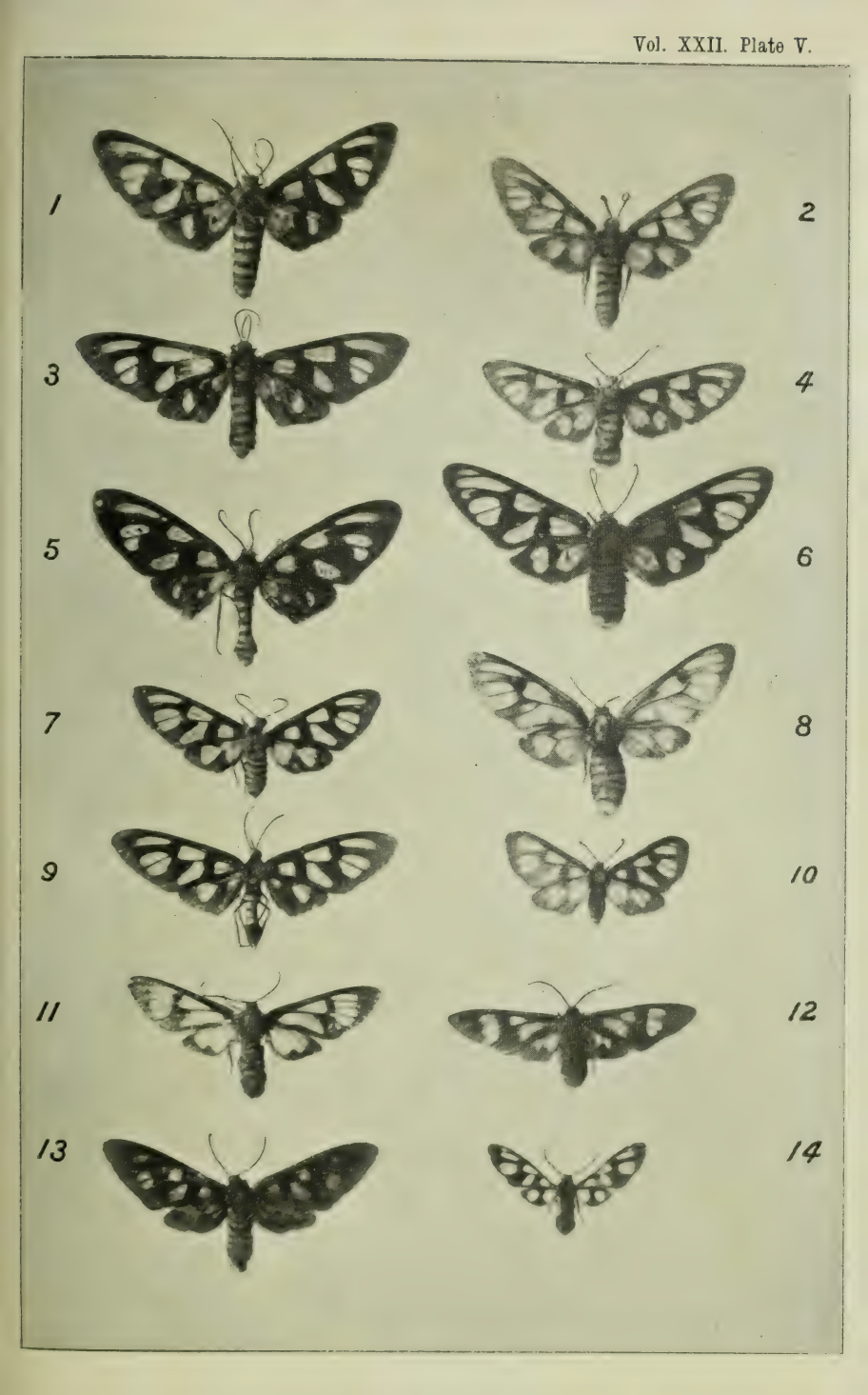
EUCHROMIA, *Hb.*

EUCHROMIA POLYMENA, *Lin.*

Sphinx polymena, Lin., Syst. Nat. II., 106 ; Cr. 13, D.; Meyr., l.c., 142. North Australia ; one specimen in the Macleay Museum.

EUCHROMIA IRUS, *Cr.*

Sphinx irus, Cr., 368A ; *Slaucopis irius*, Boisd., Voy. Astr., V., 192 ; *S. ganymede*, Dbld. Soct. Disc., 519, Pl. III., 3 ; *Euchromia irus*, Meyr., l.c., 143. Cape York and Cookstown, Queensland.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A List of Plants collected on Mt. Lyndhurst Run, S. Australia.

By Max Koch.

[Read, September, 6, 1898.]

This list embodies the result of my gatherings, which I undertook for the Central Agricultural Bureau, at the request of the General Secretary, Mr. A. Molineux. The classification is in accordance with the "Handbook of the Flora of Extratropical South Australia." The area worked is of comparatively small extent, not exceeding 200 square miles.

The exact locality is situated about 12 miles due north from the old Yeralina Head-station, embracing a portion of the Mt. Freeling Hills in the east, the Yeralina and Twins (now called Pindalpena) Creeks in a southerly and westerly direction, and terminating at the lower portion of the George Creek in the north. Though slightly to the north of District S., I have decided at Prof. Tate's suggestion and in accordance with the general complexion of my collection, to move the geographic boundary, by enclosing the Mt. Freeling Hills and the surrounding elevated country in District S. The collection would not have been by far so representative, if it was not for the enthusiastic co-operation of my neighbours, Messrs. J. Langley, of the Trinity Well, and W. Langley, of Mt. Fitton mine, and I wish hereby to acknowledge their valuable help in the cause of science.

The greater number of the plants had been named by Mr. J. H. Maiden, Director of the Botanic Gardens, Sydney, through the agency of the Central Agricultural Bureau, Adelaide, while the remainder have been named, and a large number of of the whole revised, as indicated by prefixed asterisk, by Professor R. Tate, of the University of Adelaide.

Being intimately associated with the rearing of stock, I have made it my business to investigate which plants are most suitable and valuable for pasture, and notes of the economic value of each plant, as far as known to me by personal observation, are herewith given.

I have also ascertained a few aboriginal names for various plants, as well as the uses they are put to by the natives, and I trust these additions to my list will be of some interest.

Ranunculaceæ.

Ranunculus parviflorus, *Linne.* Good fodder.
*Myosurus minimus, *Linne.*

Papaveraceæ.

*Papaver aculeatum, *Thumb.* Rare.

Capparideæ.

*Cleome viscosa, *Linne.* Fodder.

Cruciferæ.

All useful fodder plants.

*Erysimum brevipes, *F. v. M.*

*Erysimum Blennodia, *F. v. M.*

*Sisymbrium trisectum, *F. v. M.* I note three forms here. My No. 221, with white flowers and linear-filiform leaves, is probably the typical form. No. 325 resembles very much the above, but has pale-yellow flowers, and being generally found in the presence of *S. nasturtioides*, it may be a hybrid. No. 328. The foliage of this form is denser, the leaves are broader, somewhat thick and succulent, and the racemes more robust. The flowers of this form are always at the top end of the stalk, which gradually grows longer as the flowering proceeds; while in Nos. 221 and 325 the flowering begins at the bottom end of the raceme, which only shows buds at the top-end.

*Sisymbrium nasturtioides, *F. v. M.* "Mustard-bush."

*Sisymbrium procumbens, *Tate.* Rare.

*Stenopetalum lineare, *R. Brown.* Aboriginal name, *Warcoontoo.* An article of food for the natives.

*Alyssum minimum, *Pallas.*

*Menkea australis, *Lehm.*

Menkea australis, *Lehm.* My No. 326 is a variety differing from the typical form by the paucity of foliage. It is quite prostrate, racemes are filiform, flowers white, more minute than with *M. australis*, and the fruits somewhat narrower at the apex, and slightly wrinkled.

Capsella cochlearina, *F. v. M.*

Capsella ochrantha, *F. v. M.*

*Lepidium phlebopetalum, *F v. M.* "Cress."

*Lepidium papillosum, *F. v. M.* "Cress." Aboriginal name, *Nalaka.* The seeds are eaten by the natives.

*Lepidium ruderale, *Linne.* Three forms are noticed here. My No. 272 is a stout herb, with radical, deeply-lobed glabrous leaves, flowers in short corymbose racemes, pods half-line long. No. 324. Leaves glabrous and lobed, flowers in long racemes, pods half-line long. No. 388. Stems and leaves slightly hairy, lower leaves lobed, upper ones entire, pods $1\frac{1}{2}$ line long.

Frankeniaceæ.

*Frankenia lævis, *Linne.* Useless for fodder. Two forms I have noticed, one with ovate leaves, the other with linear leaves.

Pittosporeæ.

Pittosporum phillyræoides, *De Can.* "Apricot-tree." An ornamental tree; the foliage is eaten by cattle. Aboriginal name, *Madroo.* The seeds are eaten by the natives.

*Bursaria spinosa, *Cav.* "Boxbush." Collected by Mr. Langley near Mt. Livingstone.

Rutaceæ.

*Eriostemon difformis, *Cunn.*, var. teretifolius. Collected by Mr. Langley near Mt. Livingstone.

Zygophylleæ.

*Tribulus hystrix, *R. Br.* Fodder. Aboriginal name, *Koola.* Though some species of *Zygophyllum* are said to be injurious to stock, I have no evidence to that effect, but I noted stock feed freely of them.

*Zygophyllum apiculatum, *F. v. M.* Fodder. Collected by J. Langley, Trinity Well.

*Zygophyllum fruticulosum, *De Can.* Useful fodder. Aboriginal name, *Medeewurta*; an article of food for the natives.

Zygophyllum ammophilum, *F. v. M.*

Zygophyllum Billardieri, *De. Can.*

*Zygophyllum prismatothecum, *F. v. M.*

*Zygophyllum Howittii, *F. v. M.* Collector, J. Langley.

*Zygophyllum iodocarpum, *F. v. M.* Suspected of being injurious.

*Zygophyllum glaucescens, *F. v. M.* Useful fodder. Aborignal name, *Nilday.* An article of food for natives.

Geraniaceæ.

Erodium cygnorum, *Nees.* Valuable fodder. Aboriginal names, *Yarpee*, *Windoo*, *Wuntooka.* The herb is largely eaten by the natives.

Oxalis corniculata, *Linne.* Soursobs. Fodder; eaten by the aborigines.

Sapindaceæ.

Heterodendron oleaefolium, *Desf.* The foliage of this tree is greatly relished both by cattle and sheep. Aboriginal name, *Mindra*, the seed of which forms an article of food for the natives.

*Dodonæa viscosa, *Linne.* "Hopbush."

Dodonæa viscosa, variety, angustifolia.

*Dodonæa lobulata, *F. v. M.* "Hopbush.'

All three collected by W. Langley at the Daly and Stanley mine.

Dodonæa microzyga, *F. v. M.* "Red Hopbush."
All the above Dodonæas are cropped by sheep.

Phytolaccæ.

*Codonocarpus pyramidalis, *F. v. M.* "Poplar tree."

Malvaceæ.

All more or less useful for fodder.
Sida corrugata, *Lindl.*
Sida virgata, *Hooker.* Aboriginal names, *Watteeworroo* and *Burdaddee.*
Abutilon Mitchelli, *Bentham.* Ornamental. Aboriginal name, *Yarreedee.*
*Abutilon oxycarpum, *F. v. M.*
Abutilon Fraseri, *Hooker.*
*Lavatera plebeia, *Sims.* A valuable fodder plant, also ornamental. Aboriginal names, *Wirpa*, *Koornma*, and *Wurnma.* The roots (*apara*) of young plants are eaten by the natives.
Malvastrum spicatum, *A. Gray.* Useful fodder.
*Hibiscus brachysiphonius, *F. v. M.* Rare.
*Gossypium Sturtii, *F. v. M.* A very ornamental shrub.

Tiliaceæ.

*Corchorus longipes, *Tate, n. sp.* Fodder.

Euphorbiaceæ.

*Euphorbia erythrantha, *F. v. M.* Fodder.
Euphorbia Drummondii, *Boiss.* Fodder.
Euphorbia eremophila, *Cunn.* Fodder.
These herbs are looked upon with suspicion as poisonous, but reliable proofs are wanting.
*Phyllanthus rhytidospermus? *F. v. M.* Rare.
Phyllanthus lacunarius, *F.v.M.*
*Phyllanthus trachyspermus, *J Hooker.* Collector, W. Langley
The same as the Mount Parry plant, which was wrongly attributed to *P. Gunni.* [R.T.]
*Beyeria opaca, *F. v. M.* Collected by W. Langley.

Portulaceæ.

All these herbs are eaten by stock.
Portulaca oleracea, *Linne.* Good fodder; Aboriginal name, *Monyeroo.* The leaves and seeds are an article of food for the aborigines.
Claytonia Balonnensis, *F. v. M.*? Aboriginal name, *Parakilya.*
*Claytonia pumila, *F. v. M.* The only previous record for South Australia is "near Macdonnell Range, C. Giles."
*Claytonia volubilis, *F. v. M.* Though described to have 8 to 10 stamens, I often found 18 or 20.

Caryophylleæ.

*Spergularia rubra, *Camb.* It occurs in two forms, one is prostrate, the other erect; fodder.

Polygonaceæ.

Muehlenbeckia Cunninghamii, *F. v. M.* Fodder. "Lignum"; Aboriginal name, *Burdinga.*

Chenopodiaceæ.

Comprising the most important and widely distributed fodder-plants of the district.

Atriplex stipitatum, *Bentham.*

Atriplex nummularium, *Lindl.* "Old-man Saltbush"; aboriginal name, *Nilpena.*

Atriplex vesicarium, *Hew.* Bladder saltbush. This is the most valuable saltbush of all. A variety has been noted by me in the Mt. Freeling Hills, which resembles the typic form in habit and foliage, but the fruits show only the inner herbaceous valves, while the bladder-like appendages are either wanting or very minute. Aboriginal names, *Billacurroo, Dandayree.*

Atriplex velutinellum, *F. v. M.* Collector, J. Langley.

Atriplex fissivalve, *F. v. M.*

*Atriplex angulatum, *Bentham.* I notice a variety differing in habit, form of foliage, and fruits. The latter consist of two thin three-angled valves with either one or two small hornlike dorsal appendages, which, however, are not unusual.

Atriplex leptocarpum, *F. v. M.*

*Atriplex limbatum, *Benth.* "Spreading Saltbush."

Atriplex halimoides, *Lindl.* About four varieties have been noticed by me, the chief difference is in the shape of fruits. Aboriginal name, *Maltoo*, which seems to be also employed for several other annual saltbushes.

*Atriplex holocarpum, *F. v. M.* Annual or Pop-saltbush, so called on account of the popping noise the fruits produce when trod upon. Aboriginal name, *Maltoo.*

Several varieties of this species has been noticed by me.

(*a*). Stems robust fruits large, nearly globular and spongy, This is the typic form.

(*b*). Foliage much crowded and very watery; fruits ovoid, somewhat acuminate. Stems herbaceous. This is the *spongiosa*-form of F. v. Mueller.

(*c*). Stems rather rigid, woody and brittle; fruits obovate, intermediate in shape, but with a hard and shining epiderm.

Atriplex Kochianum, *Maiden.* Stems erect, angular, woody, and brittle. Leaves very angular, whereby it can be easily

distinguished from *A vesicarium*, to which it is allied. Fruits have two large, thick, nearly basal ovate-lanceolate appendages.

Rhagodia spinescens, *R. Br.* Useful fodder. Spinescent only when very old, or in adverse seasons. Aboriginal name, *Yillaroo*.

Rhagodia nutans, *R. Br.* Good fodder.

*Chenopodium nitrariaceum, *F. v. M.*

Chenopodium auricomum, *Lindl.* Good fodder.

Chenopodium cristatum, *F. v. M.* Fodder.

Enchylæna tomentosa, *R. Brown.* Fodder. Aboriginal name, *Burlahmee*. These fruits are an article of food for the natives.

*Threlkeldia proceriflora, *F. v. M.*

Kochia lobiflora, *F. v. M.* Rare.

Kochia brevifolia, *R. Brown.* "Bluebush."

Kochia pyramidata, *Benth.* "Bluebush." Aboriginal names, *Ooneroo* and *Koonambirra*.

Kochia eriantha, *F. v. M.* Rare.

*Kochia spongiocarpa, *F. v. M.* "Bluebush."

Kochia villosa, *Lindl.* "Cotton-bush." Four forms have been noticed here; the difference is principally in the more or less dense woolliness of stems and foliage, size of fruits, and habit of growth of the plants.

Kochia sedifolia, *F. v. M.* "Bluebush."

Kochia aphylla, *R. Br.* "Cottonbush." Valuable fodder, often spinescent. Aboriginal names, *Bulka* and *Poondoo-poondoo*.

Kochia ciliata, *F. v. M.* Aboriginal name, *Moodlee*.

Kochia brachyptera, *F. v. M.*

*Bassia Dallachyana, *Benth.* Fodder, but injurious to sheep when in fruit, as these are densely enveloped in cottony wool, and if partaken of in quantities they will form indigestible felty balls in the entrails of sheep, which often die in consequence of them.

Bassia tricornis, *Bentham.*

Bassia biflora, *F. v. M.*

Bassia paradoxa, *F. v. M.*

Bassia lanicuspis, *F. v. M.*

Bassia diacantha, *F. v. M.*

*Bassia uniflora, *F. v. M.*

Bassia bicornis, *F. v. M.*

Bassia eriochiton, *Tate.*

*Bassia quinquecuspis, *F. v. M.* Aboriginal name, *Yate*.

*Bassia divaricata, *F. v. M.* Aboriginal name, *Yalkirray*

Bassia bicuspis, *F. v. M.*

*Bassia Tatei, *F. v. M.*

All the Bassias, especially in the earlier stages of growth, provide palatable and succulent fodder for stock; and, although the spiny nature of the fruits of some of them is objectionable in wool, the pastoralist of the Far North should not condemn these plants on that account, because these spiny fruits are the very safeguards against eradication of a most useful class of fodder-plants.

Babbagia dipterocarpa, *F. v. M.*

*Babbagia acroptera, *F. v. M.* and *Tate.*

*Babbagia pentaptera, *F. v. M.* and *Tate.*

*Salicornia arbuscula, *R. Brown.* Aboriginal name, *Tarapoolia.*

Salsola Kali, *Linne.* "Roley-Poley." Aboriginal name, *Yilka.* Very useful fodder.

Amarantaceæ.

Euxolus Mitchelli, *F. v. M.* Fodder.

Euxolus interruptus, *Miguel.* Rare. The first record for South Australia.

Ptilotus obovatus, *F. v. M.* Good fodder.

Ptilotus exaltatus, *Nees.* Ornamental. Collector, Mr. Langley.

*Ptilotus nobilis, *F. v. M.* Ornamental. Good fodder. Aboriginal name, *Anemaheewurta.*

*Alternanthera triandra, *Lam.* Good fodder.

Nyctagineæ.

*Boerhaavia repanda, *Willd.* Collected by W. Langley at Mt. Fitton.

Boerhaavia diffusa, *Linne.* Good fodder. Two forms are noted here, which the aborigines also seem to distinguish. No. 65, Stems and leaves hairy; aboriginal name, *Tawo.* No. 66, Stems and leaves glabrous; aboriginal name, *Padloo.* The natives eat the roots of these herbs, which they call *Murra.*

Urticaceæ.

Parietaria debilis, *A. Forster.* Good fodder.

Casuarineæ.

Casuarina glauca, *Sieb.* "Blackoak." The foliage is a valuable fodder. Aboriginal name, *Alkoo.*

Leguminosæ.

*Daviesia genistifolia, *Cunn.* Collected near Yudnamuttena by Mr. W. Langley.

Templetonia retusa, *R. Brown.* Collected by Mr. H. L. Hughes, of Umberatena.

Templetonia egena, *Benth.* "Broombush." Aboriginal names, *Atara* and *Binyee.*

*Goodia medicaginea, *Salisb.* Collected by Mr. W. Langley near Mt. Livingstone.

[*Crotalaria Cunninghamii, *R. Br.* Not eaten by stock. "Hacks' Bean, Parrot-plant," ornamental. Introduced by me into the district.]

*Æschynomene indica, *Linne.* Rare.

*Indigofera australis, *Willd.*

*Indigofera brevidens, *Bentham.* Both collected by Mr. W. Langley at Mt. Livingstone.

Clianthus Dampieri, *Cunn.* Good fodder; perhaps the most ornamental plant in the North. Aboriginal names, *Ngarabana* and *Minyee-minyeelparry.*

*Swainsonia phacoides, *Benth.*

*Swainsonia campylantha, *F. v. M.*

*Swainsonia stipularis, *F. v. M.*

*Swainsonia oroboides, *F. v. M.* These Swainsonias, or Vetches, yield fattening fodder, and as far as can be ascertained are not injurious to stock.

*Psoralea patens, *Lindl.* Fodder.

Trigonella suavissima, *Lindl.* Good fodder. "Scented clover." Aboriginal names, *Walpurla*, *Kanba*, *Kadumma*, and *Columba.* The latter name is from Innamincka blacks.

Lotus australis, *Andrews*, var. Behrianus. A variety with white flowers has been noticed here. "Poison-weed." Mr. H. L. Hughes, an experienced man with stock, informs me that this weed is very dangerous to sheep, especially when in fruit. It affects sheep most when they partake of it in quantities on an empty stomach, or when they are kept in a yard after feeding freely of the herb. The symptoms are a drooping of the ears of the sheep, which soon become drowsy and stupid; their stomachs are getting distended, and at last they lie down and die. Sheep, when grazing in a paddock, rarely die from the herb, because they feed on other herbage as well. In the event of a flock being driven over a patch where the herb grows thickly, the best plan is to take them from it, and to let them go. Do not yard them under any circumstances, and should symptoms of poisoning appear after yarding, turn the sheep out on feed as quickly as possible. Bleeding will often save a sheep.

*Glycine tabacina, *Benth.* Fodder.

Rhynchosia minima, *De Can.* Fodder.

*Cassia pruinosa, *F.v.M.*

*Cassia desolata, *F.v.M.*

Cassia Sturtii, *R. Brown.*

Cassia artemisioides, *Gaudichaud.*

*Cassia eremophila, *Cunn.*

*Cassia phyllodinea, *R. Brown.*

All these Cassias are ornamental, the foliage and the pods are eaten by sheep. Aboriginal names, *Bundey* and *Wammalleroo.* The seed used to form an article of food for the natives.

*Petalostylis labicheoides, *R. Br.* Ornamental. Aboriginal name, *Warreedee.*

[*Bauhinia Carronii, *F. v. M.* Beantree; very ornamental and shady, introduced by me from Strezelecki Creek into the district. Aboriginal name, *Moodloo.*]

Acacia tetragonophylla, *F. v. M.* "Deadfinish." Aboriginal name, *Bararrecka.*

*Acacia papyrocarpa, *Bentham.* A tree up to 20 feet high. Aboriginal name, *Myall.* Collected by Mr. J. Langley at Trinity Well.

Acacia Sentis, *F. v. M.* "Prickly Acacia." Aboriginal name *Kalyoo.*

*Acacia retinodes, *Schlecht.* "Wattle." Aboriginal name, *Weerilda.*

Acacia sp. No. 9. Aboriginal names, *Aroo, Kakooroo, Wurra.* Blacks use the ashes of the leaves in the preparation of Pitchorree (a narcotic).

*Acacia salicina, *Lindl.* "Native Willow," and variety *varians.* Aboriginal name, *Balkoora.*

*Acacia iteaphylla, *F. v. M.* (?) Material incomplete.

*Acacia Osswaldi, *F. v. M.* "Bastard Myall." Aboriginal name, *Whyacka.*

Acacia aneura, *F. v. M.* Local and aboriginal name, *Mulga.*

The Acacias provide useful fodder for stock, especially in adverse seasons. The foliage of *A. aneura* being particularly relished, while *A. sentis* is greatly patronised by the camel The timber of *A. aneura* is much esteemed and used for posts in preference to all others, and the bark of *A. salicina* is often used by bushmen for tanning skins, with good results.

The seeds of some species are used by the aboriginals as an article of food, and the very hard timber of *A. tetragonophylla* is utilised for clubs (waddies) when the knobby roots of the Mallee are not procurable.

Thymeleæ.

Pimelea simplex, *F.v.M.* A seemingly useless weed, which no animal will eat. Aboriginal name, *Namala.*

Pimelea microcephala, *R. Brown.* Foliage much in request for fodder by sheep. Aboriginal name, *Willparee,* name of berries, *Narreemahee.*

The aboriginals make use of this shrub and its fruits for medicinal purposes. They boil, for instance, the bark of the roots and drink the liquid for the throat and chest complaints, and they twist the extremely tough and fibrous bark of the roots into strings or thin cords, and tie them around their stomach or around their aching head, or other parts of the body, in order to remove the pain. Seeds when chewed are very injurious.

Proteaceæ.

*Grevillea lavandulacea, *Schlecht*, var. Collector, Mr. W. Langley.

*Hakea Ednieana, *Tate*. "Cork-tree." Collector, Mr. J. Langley, Trinity Well. Aboriginal name, *Yantana*.

Hakea leucoptera, *R. Br.* "Needle-bush." Aboriginal name, *Kooloova*. The aboriginals when hard-pressed for a drink extract water from the running roots, called *Nappa-koparee*. They first burn down the bush, thus driving all the moisture into the roots, which they dig out. One end of the root is exposed to the heat of a fire, and the water trickles out from the other end into a receptacle, often consisting of a wallaby skin turned inside out.

Crassulaceæ.

*Tillæa verticillaris, *De Can.*

Ficoideæ.

Tetragonia expansa, *Murray*. "Native Spinach." A valuable fodder plant; also used as a pot-herb by Europeans as well as blacks, who name the herb, *Paldroo*.

Aizoon quadrifidum, *F. v. M.* Fodder.

*Aizoon zygophylloides, *F. v. M.* Fodder.

Also, a variety with pink sepals has been noted by me.

Trianthema crystallina, *Vahl*. Aboriginal name, *Maparee*.

*Zaleya decandra, *Burm.* Fodder.

Mollugo hirta, *Thunberg*. Fodder.

*Mollugo Cerviana, *Seringe*.

Lythrarieæ.

*Lythrum hyssopifolia, *Linne*. Collector, Mr. W. Langley.

Myrtaceæ.

*Callistemon teretifolius, *F. v. M.* Collector, Mr. W. Langley.

Melaleuca glomerata, *F. v. M.* "White tea-tree." Aboriginal names, *Wooda*, *Kooda*.

Melaleuca, species. "Black tea-tree." Aboriginal names, *Woota*, *Koota*.

Eucalyptus oleosa, *F. v. M.* Aboriginal name, *Mallee*.

Eucalyptus rostrata, *Schlecht*. "Gumtree." Aboriginal name, *Kalpooroo*; the seed, *Power*, an article of food for the blacks,

Rhamnaceæ.

*Cryptandra phlebophylla, *F. v. M.* Near Mt. Livingstone, Mr. W. Langley. The only previous record is "Elder's Range, near Lake Torrens."

Santalaceæ.

Santalum lanceolatum, *R. Br.* "Cattle-bush," "Currant-tree." Aboriginal name, *Mandaworra.* Ornamental. Good fodder. Blacks eat the fruits. A friend of mine asserts that on a hot summer's day he was driving a flock of sheep in company with a black boy, and met with a tree loaded with ripe fruit. Both ate a large quantity of it and fell asleep. Awaking, they drove the sheep further on, and met with another tree; ate some more fruit with the same result. My friend is of opinion that the berries contain narcotic properties.

Santalum acuminatum, *De Can.* "Peach-tree." Aboriginal name, *Nakala.* Both Europeans and blacks use the fruits as an article of food. Cattle will greedily eat the foliage, breaking the rather brittle branches off with their horns.

Haloragieæ.

*Loudonia aurea, *Lindley.* Near Yoodnamuttena Mine.
*Haloragis aspera, *Lindl.* Fodder.

Umbelliferæ.

*Didiscus glaucifolius, *F. v. M.* Fodder.
Daucus brachiatus, *Sieb.* Fodder. "Native-carrot."
*Hydrocotyle trachycarpa, *F. v. M.*

Cucurbitaceæ.

Melothria maderaspatana, *Congn.* Aboriginal name, *Willa-lillalee.* Blacks eat the fruits.

Loranthaceæ.

*Loranthus linophyllus, *Fenzl.* Aboriginal name, *Partapee.*
*Loranthus pendulus, *Sieb.* Aboriginal name, *Weedla.*
Loranthus Quandang, *Lindl.* Aboriginal name, *Yappee mulgatee.* These mistletoes are gradually destroying all shrubby vegetation. They are, however, eaten by stock, and the berries are in demand by the natives for food.

Compositæ.

*Wedelia platyglossa, *F. v. M.*
*Flaveria Australasica, *Hooker.* Fodder.
*Aster pimeleoides, *Cunn.* Collected by W. Langley.
*Dimorphocoma minutula, *F. v. M.* and *Tate.*
*Podocoma cuneifolia, *R. Br.* Collected by J. Langley.
*Vittadinia australis, *Rich.* Fodder. Also a variety with narrow and entire leaves, *J. H. Maiden.*

Minuria leptophylla, *De Can.* Ornamental.
*Minuria integerrima, *Benth.*
*Minuria suaedifolia, *F. v. M.*
Calotis hispidula, *F. v. M.* Objectionable.
Calotis cymbacantha, *F. v. M.* Fodder.
Calotis scabiosifolia, *Sonder* and *F. v. M.* Ornamental.
Calotis plumulifera, *F. v. M.* Fodder.
*Brachycome calocarpa, *F. v. M.*
*Brachycome pachyptera, *Turcz.* Good fodder.
*Brachycome ciliaris, *Less.* Good fodder. Two forms have been noticed here. No. 261, stems woolly, leaves linear lobed and dense, rays blue. No. 346, stems and leaves glabrous; leaves few, broader, with short lobes ; rays blue.
*Senecio Gregorii, *F. v. M.* Good fodder.
*Senecio lautus, *Solander.* Good fodder.
*Senecio magnificus, *F. v. M.* Not eaten by stock, but ornamental.
*Senecio anethifolius, *Cunn.* Collected by Mr. W. Langley, Yoodnamuttena.
Senecio brachyglossus, *F. v. M.* Fodder.
*Centipeda thespidioides, *F. v. M.* Useless.
*Stuartina Muelleri, *Sonder.*
*Elachanthus pusillus, *F. v. M.*
*Rutidosis helichrysoides, *De Can.* Fodder.
*Pterigeron liatroides, *Bentham.*
*Pterigeron dentatifolius, *F. v. M.*
*Ixiolæna leptolepis, *Benth.* Not much use.
*Ixiolæna tomentosa, *Sonder* and *F. v. M.*
Cassinia lævis, *R. Br.* A shrub, collected by Mr. H. L. Hughes Umberatena.
*Podolepis canescens, *Cunn.* Ornamental. Collected by W. Langley, Mt. Distance.
Podolepis Lessoni, *Bentham.*
Gnaphalium luteo-album, *Linne.* Useless.
*Gnaphalium indutum, *Hooker.*
*Gnaphalium Japonicum, *Thunberg.*
*Leptorrhynchos pulchellus, *F. v. M.*
*Helipterum moschatum, *Bentham.*
Helipterum polygalifolium, *De Can.* Ornamental.
Helipterum strictum, *Benth.* Good fodder.
Helipterum floribundum, *De Can.* Ornamental.
*Helipterum pygmæum. *Benth.*
*Helipterum microglossum, *Tate.* Ornamental.
*Helipterum Troedelii, *F. v. M.* Slightly odoriferous.
*Helichrysum podolepideum, *F. v. M.*
*Helichrysum semipapposum, *De C.*
*Helichrysum ambiguum, *Turcz.* Collected by J. Langley.

*Polycalymma Sturtii, *F. v. M.* Ornamental.
*Hyalolepis rhizocephala, *De C.*
Angianthus pusillus, *Bentham.*
*Gnephosis skirrophora, *Bentham.*
*Gnephosis eriocarpa, *Bentham.*
*Gnephosis cyathopappa, *Bentham.*
*Gnaphalodes uliginosum, *A. Gray.*
*Craspedia chrysantha, *Bentham.*
*Craspedia pleiocephala, *F. v. M.*
*Pterocaulon sphacelatus, *Benth.* and *Hooker.* Local name, "Horehound." Aboriginal name, *Yunga-yunga.* The decoction of the leaves of this perennial plant is used by bushmen for colds. Others flavour their tea by putting a leaf or two in it.

Campanulaceæ.

Isotoma petraea, *F. v. M.* Fodder.
*Wahlenbergia gracilis, *De Can.* "Native Bluebell." Ornamental.

Goodeniaceæ.

Scævola spinescens, *R. Br.* Fodder. Aboriginal name, *Poorntoo.* Blacks eat the berries.
*Goodenia pinnatifida, *Schlecht.* Variety with linear-lanceolate leaf-segments.
*Goodenia ovata, *Smith.*
*Goodenia calcarata, *F. v. M.*
*Goodenia glauca, *F. v. M.*
*Goodenia heteromera, *F. v. M.*

Convolvulaceæ.

*Ipomæa heterophylla, *R. Br.* Aboriginal name, *Woonooroo.* Natives eat the roots.
*Convolvulus erubescens, *Sims.* Fodder. Aboriginal name, *Noonyay.*
*Evolvulus linifolius, *Linne.* Collected by W. Langley, Mt. Livingstone.

Borragineæ.

All but of slight fodder-value.
Heliotropium curassavicum, *Linne.*
Heliotropium Europæum, *Linne.*
*Heliotropium tenuifolium, *R. Brown.*
*Pollichia Zeylanica, *F. v. M.* Ornamental.
Echinospermum concavum, *F. v. M.*
Eritrichium australasicum, *De Can.*
*Cynoglossum Drummondii, *Benth.* Collected by W. Langley, Mt. Fitton.

Asclepiadeæ.

Sarcostemma australe, *R. Br.* "Milk-bush." Almost extinct. Aboriginal names, *Meeninya* and *Parde-bardettee.* Bushmen use the milk to heal sores. I have often seen sheep to feed off this bush.

Marsdenia Leichhardtiana, *F. v. M.* Fodder. "Native Pear." Aboriginal name, *Howla* (fruit). Name of plant, *Toopara.* The natives eat the roots, leaves, flowers, and seeds of this plant.

Gentianeæ.

*Erythræa spicata, *Pers.* Fodder.

Plantagineæ.

Plantago varia, *R. Br.* "Rib-grass." Good fodder.

Solanaceæ.

*Solanum esuriale, *Lindl.* Aboriginal name, *Puddadee.* Berries when ripe are eaten by blacks.

*Solanum chenopodium, *F. v. M.*

*Solanum ellipticum, *R. Br.* Aboriginal name, *Yoomeroo.* Berries are edible.

Lycium australe, *F. v. M.* Fodder. Aboriginal names, *Beeree, Wadneree.* The aboriginals eat the fruits.

Datura Leichhardtii, *F. v. M.* As this plant is closely allied to *Datura stramonium*, it would be interesting to know whether it possesses the same medicinal properties as the former. Sheep will readily eat it.

Nicotiana suaveolens, *Lehm.* "Native tobocco." This plant is injurious to stock.

Labiatæ.

*Mentha australis, *R. Br.* "Mint," strongly odoriferous

Teucrium racemosum, *R. Br.* Fodder.

*Prostanthera striatiflora, *F. v. M.* An ornamental shrub, "Lilac-bush." Aboriginal name *Yulpoo.*

Scrophularineæ.

*Stemodia Morgania, *F. v. M.* Collected by Mr. W. Langley near Ooloo Tank.

*Limosella Curdieana, *F. v. M.*

Acanthaceæ.

Justicia procumbens, *Linne.* Rare.

Myoporineæ.

*Myoporum montanum, *R. Br.* "Myrtle-tree." Aboriginal name *Adloo.* Fruits are eaten by blacks.

Myoporum refractum, *Maiden.* Useless for fodder.

Eremophila scoparia, *F. v. M.* "Balsambush."
Eremophila longifolia, *F. v. M.* Aboriginal name, *Kooyamurra.* The natives use the branches of this tree for the sacred purpose of covering their dead.
*Eremophila Freelingii, *F. v. M.* "Honeysucklebush." A white flowering form has been observed. Aboriginal name, *Kaltya* or *halya.*
Eremophila oppositifolia, *R. Br.* Aboriginal name, *Weeooka.*
Eremophila Brownii, *F. v. M.*
Eremophila Duttonii, *F. v. M.* Aboriginal name, *Kaltya, halya.*
Eremophila maculata, *F. v. M.* "Emubush." Aboriginal name, *Nanyoo.*
Eremophila latifolia, *F. v. M.* Rare.
*Eremophila alternifolia, *R. Br.* "Honeysucklebush." Aboriginal names, *Kaltya, halya.*

The Myoporineæ are more ornamental than useful, still sheep will feed on them sparingly in bad seasons, and thus prolong their existence, and I have often seen them lick up the shed corollæ with avidity.

Coniferæ.

Callitris verrucosa, *R. Br.* "Pinetree." Collected near Mt. Livingstone by Mr. W. Langley.

Amaryllideæ.

Crinum pedunculatum, *R. Br.* Ornamental.
*Calostemma luteum, *Sims.* Ornamental. Aboriginal name, *Waddywurra.*

Liliaceæ.

Wurmbea dioica, *F. v. M.* "Lily."
Dianella revoluta, *R. Br.*
Bulbine bulbosa (?) *Hav.* Aboriginal name, *Boontooka.*
*Thysanotus tuberosus, *R. Br.* Blacks eats the tubers.
*Xanthorrhoea quadrangulata, *F. v. M.* "Grass-tree." So far as the material permits of identification.

Fluviales.

*Triglochin calcitrapa, *Hooker.*

Cyperaceæ.

Cyperus rotundus, *Linne.* Ornamental. This species has a cormlike root.
*Cyperus vaginatus, *R. Brown.*
Cyperus subulatus, *R. Br.* (?).

N.B.—There is a cyperus species growing here which, however, is not satisfactorily identified. It has a small

bulbous root, from which long filiform roots spring, at the ends of which new bulbs are formed. These small bulbs have a nut-like taste, and are eagerly dug after by the natives, who call them *Kudnamurra*, *Ala*, *Yower*, *Tharaka*, the name *Yower* being mostly used by Mt. Lyndhurst blacks.

Cyperus laevigatus, *Linne*, var. Collected by Mr. J. Langley, Trinity Well.

*Cyperus alterniflorus, *R. Brown.*

*Heleocharis acuta, *R. Brown.* Collected by Mr. J. Langley, St. George Creek.

*Scirpus litoralis, *Schrader.* Also collected by Mr. J. Langley at Fishponds. Walparinna Springs, near Mount Freeling.

Gramineæ.

Only a very few of this order are not fit for fodder, and those species which are most widely distributed through the district are generally considered the most useful. The aboriginals call grass and other small herbage *Kanta.*

Panicum coenicolum, *F. v. M.* Rare. Aboriginal names, *Talghee*, *Allee.* The seed called *Power-tundra* is an article of food for the blacks of the district.

*Panicum divaricatissimum, *R. Br.* Rare.

*Panicum gracile, *R. Br.* "Food-grass." Aboriginal name, *Talghee.* Blacks eat the seeds of this species. A quickly-growing grass after a flood.

*Panicum leucophœum, *H. B. K.*

Panicum reversum, *F. v. M.* Not sufficiently plentiful to be of value for fodder.

*Setaria viridis, *Palisot.* Rare.

*Erianthus fulvus, *Kunth.* "Sugar-grass." Aboriginal name, *Aldroo.* A valuable grass.

Andropogon sericeus, *R. Rr.* "Rattail-grass." Very valuable.

Andropogon punctatus, *Roxb.* Good fodder.

Andropogon exaltatus, *R. Br.* "Scent-grass." Of no fodder value.

*Anthistiria ciliata, *Linne.* "Kangaroo-grass." Ornamental, but rare.

*Anthistiria membranacea, *Lindl.* "Barcoo-grass." Useful fodder.

Eriochloa polystachya, *Humb.* and *Kunth.* Much esteemed.

Tragus racemosus, *Haller.* "Bur-grass." Fodder.

Pappophorum commune, *F. v. M.*, and *var.* avenaceum. "Summer-grass." Useful.

*Alopecurus geniculatus, *Linne.*

*Stipa scabra, *Lindl.* "Spear-grass." Fodder.

Chloris acicularis, *Lindl.* "Spider-grass." Good fodder.
*Chloris divaricata, *R. Br.* Fodder. New for South Australia.
*Chloris truncata, *R. Brown.* Found by Mr. Langley near Mount Livingstone.
Aristida arenaria, *R. Br.* "Mulga-grass." Fodder.
*Aristida depressa, *Retz.* Rare. [*A. ramosa* of my "Handbook" belongs here.—R. TATE.]
*Aristida calycina, *R. Br.* "Spear-grass."
*Sporobolus actinocladus, *F. v. M.* Useful fodder. I have often noticed this grass to be infested by a fungus.
[Cynodon Dactylon, *Rich.* "Couch-grass." This grass was introduced by me into the district.]
Triraphis mollis, *R. Br.* Rare.
Astrebla pectinata, *F. v. M.* "Mitchell-grass." A perennial. One of the most valuable grasses of the North. Aboriginal name (Queensland), *Taldra anta.*
*Astrebla triticoides, *F. v. M.* "Annual Mitchell-grass." Very much esteemed for fodder.
*Bromus arenarius, *Labillard.*
Diplachne loliiformis, *F. v. M.* Too minute to be of value.
Eleusine cruciata, *Lam.* "Summer-grass." "Eight-day-grass." A very quick-growing, though not lasting, grass. Aboriginal name, *Wallamurroo.*
Triodia irritans, *R. Br.* "Porcupine-grass." Of no value, except the young shoots after a burning of the old grass. The long fruit-spikes are eaten by stock.
*Triodia pungens, *R. Brown.* Found by Mrs. J. Stamford in the sandhills near Farina.
*Schedonorus litoralis, *Palisot.*
Eragrostis pilosa, *Palisot.* Useful fodder.
Eragrostis Brownii, *Nees.* Good fodder.
Eragrostis chætophylla, *Steud.* (?)
*Eragrostis falcata, *Cand.* Good fodder.
Poa ramigera, *F. v. M.* "Cane-grass." Rare. Aboriginal name, *Dickeree.*

Rhizospermæ.

Marsilea quadrifolia, *Linne.* Fodder. Aboriginal name, *Nardoo.* The natives eat the spore-cases by pounding them up into flour.

Filices.

Cheilanthes tenuifolia, *Swartz.* "Rock-fern."
Cheilanthes vellea, *F. v. M.* "Hairy Rock-fern."

INTRODUCED PLANTS, noticed at Mt. Lyndhurst.

*Sisymbrium officinale.
Erodium cicutarium.
Chenopodium murale.
*Papaver hybridum.
Centaurea melitensis.
Sonchus oleraceus.
Xanthium spinosum.
*Cryptostemma calendulacea.
Malva rotundifolia.
Nicotiana glauca.
*Silene gallica.
*Lithospermum arvense.
*Hordeum murinum.
*Phalaris canariensis.
*Picris hieracioides.
*Capsella bursa-pastoris.
*Medicago denticulata.

On Some New or Little-Known South Australian Plants.

By Professor Ralph Tate.

[Read October 4, 1898.]

Corchorus longipes, *n. sp.*, 1898.

A prostrate diffuse undershrub, with several wiry branches, radiating to one foot or more in diameter, sparsely short glandular hirsute. Leaves glabrous or slightly stellate-hirsute, oblong-lanceolate, bluntly pointed, somewhat attenuate at the base, coarsely serrate-crenate, about 10 mm. long, on stalks about one-third the length of the leaf. Stipules broadly and obliquely triangular, toothed, or simple.

Peduncles about 10 mm. long, bearing one or two pedicellate flowers in the axils of two small obliquely triangular bracteoles connate on one side, and forming a slight incomplete cup; pedicels about half the length of the peduncles, both with minute glandular hairs.

Sepals broadly lanceolate, acuminate, 3.5 mm. long, almost glabrous.

Petals bluish-white, narrow-spathulate, attenuate into a long claw, midrib distinct, 4 mm. long.

Stamens five, free, longer than the ovarium, 2.5 mm. long.

Ovarium thickly beset with short stellate-hairs, 2 mm. long, terminated by a much abbreviated style.

Capsule on straight not recurved pedicels, oval oblong, obtusely rounded at both ends, 6 mm. long, exteriorly minutely stellate-hairy and contracted between the seeds; valves five, membranous. Seeds somewhat horse-shoe shaped, smooth, 12 to 16 in each cell, without transverse partitions between them.

Mount Lyndhurst Run in the neighbourhood of Farina, South Australia.—*Max Koch.*

This species differs from its Australian congeners, which are subshrubby in habit, in many particulars; of these may be noted the long peduncles, the erect capsule, the inconspicuous vestiture of glandular hairs, the fewness of stamens, the shape of the numerous seeds. In general appearance it resembles *C. vermicularis.*

Acacia papyrocarpa, *Bentham.*

It is with some hesitation that I refer the *rigens*-like Acacia from Mount Lyndhurst to the rare *A. papyrocarpa*, on account

of the incomplete diagnosis of that species, as published in Fl. Aust., ii., p. 338. But so far it agrees with it, and differs from *A. rigens* in those particulars pointed out by Bentham. The material before me permits of a full definition of the species, which here follows incorporating the new facts with Bentham's diagnosis :—

"A small tree of about 25 feet, the branches nearly terete, glabrous or minutely hoary-pubescent. Phyllodia linear-subulate, rigid, thick, but slightly flattened (1), 2 to 3 in. long, tapering into a recurved (or straight) but not pungent point, narrowed at the base, striate with numerous fine parallel nerves only visible under a lens, slightly hoary-tomentose, especially along the centre, without any midrib."

Peduncles axillary, solitary, about half-an-inch long, bearing each a globular head, 4·5 mm. diameter, of about 20 pale-yellow 4-merous flowers.

Calyx of four sepals slightly united at the base, half as long as the corolla ; each sepal narrow-oblong, slightly dilated atop, ciliate (not hair-tufted as in *A. rigens*) on the margin of the spatulous tip, thin and transparent except the yellow summit.

Corolla of four, slightly unequal, free, incurved petals. Each petal somewhat oval in outline, slightly apiculate at the summit, and distinctly attenuated into a claw, with a distinct midrib ; smooth, thin and transparent but yellow in the upper half.

Ovarium wholly concealed beneath long silky-white threads.

"Pod flat, falcate or flexuous, 3 to 4 inches long, 4 to 5 lines broad (only here and there slightly contracted between the seeds), valves almost membranous (with raised reticulated nerves). Seeds longitudinal (acutely ovoid, flat, brown and shining, 7 x 4 vix mm.); funicle with (two) very short folds (beneath the strophiole), gradually and not much thickened from the base."

Affinities and Differences.—Bentham compared his species with *A. rigens*, with which it has much resemblance, and pointed out that the finer and more numerous veins on the phyllodes, and the form of the pod were specific differences. The further anatomical details which I have reported above, while they indicate on the one hand other characters in common, yet they augment the difference between the two species ; notably the tetramerous flowers (as noted without exception in the numerous flowers analysed) and the hairy ovarium. The hairy ovarium and 4-merous flowers agree with *A. sessiliceps*, but the sepals, phyllodes, seeds, and funiculus are different.

Localities.—The type-specimen was collected by R. Brown on the "South Coast."

In seeking to give more topographic definition of this phrase we have in the first place a choice of the localities in South Aus-

tralia, botanically explored by Robert Brown. These are Memory Cove, Port Lincoln, Kangaroo Island, Petrel Bay, Fowler Bay, St. Peter's Isles, Spencer Gulf, and Head of Spencer Gulf. And in the second place we have to consider the known distribution of the species. Of the twenty records "S. coast," a large number may be interpreted Port Lincoln, but in other cases, as *Craspedia globosa*, such an attachment is incompatible with known habitats.

As regards *A. papyrocarpa*, such an inquiry is of interest, as the original locality has long remained unique. To be in geographic harmony with subsequent records "S. coast" in this case may be regarded as signifying either the costal tracts about Fowler Bay or at the Head of Spencer's Gulf.

Baron F. v. Mueller attributes this species also to West Australia in his "Census Aust. Plants," 1882; but he had not published any other fact supplemental to Bentham's account of it, and it has no place in his Monograph of the Australian Acacias.

The only authentic record is Mount Lyndhurst Run, cited in Mr. Koch's list (see ante).

HELIPTERUM MICROGLOSSUM, *Tate.*

Ref.—Trans. Roy. Soc., S. Aust., VII., p. 104, 1883.

Syn.—*H. corymbiflorum*, var. ? *microglossa*, F. v. M., in Fl. Aust., III., p. 647. *H. microglossum*, Maiden and Betche, Proc. Lin. Soc., N.S.W., XXII., p. 151, 1897.

Localities.—In South Australia, slopes of Mount Parry and Termination Hill, and extending thence into Lake Torrens Plain (*R.T.*); Mount Lyndhurst Run, *M. Koch!* this last locality is in the same botanic region; Port Augusta, *Mrs. Richards!*; and Gawler Range, *Dr. Cleland!*. Warrina, *Mrs. Richards;* Mount Eba, *E. Giles*; and Yorke Peninsula, *O. Tepper*, from data in Melbourne Herbarium on the authority of its present Curator; but the last locality is an error, as I have ascertained by examination of Mr. Tepper's original set. In New South Wales, Goyinga Mountains, *Fl. Aust.*, and other localities recorded by Maiden and Betche, *op. cit.*

Dimorphism in Two South Australian Cruciferous Plants.

By Professor Ralph Tate.

[Read October 4, 1898.]

Bentham, in Fl. Austral., I., p. 80, thinks it possible that *Geococcus pusillus* (a monotypic genus) "may be a dimorphic state of a species of another genus . . . a radical-leaved *Blennodia*, for example."

Geococcus pusillus is recorded by F. von Mueller in "Census Australian Plants," 1882, for W.A., S.A., V., and N.S.W.; and Queensland is added in the second supplement to that census published in 1885. For South Australia the species has occurred at the following localities on the authority of Baron F. v. Mueller:—River Murray *(in litteris* to the writer), Fowler Bay (*Mrs. Richards*, in Trans. Roy. Soc., S. Aust., vol. III., p. 172, 1880), and Ardrossan, Yorke Peninsula (*J. G. O. Tepper*, T.R.S., S. Aust., vol. III., p. 175, 1880).

From these three widely separated localities I have seen plants of so-called *G. pusillus* from Ardrossan only. The duplicate set submitted to me by the collector permits me to state that the late Baron confounded two very distinct species under the one name, one being a state of *Stenopetalum sphærocarpum*, and the other a plant agreeing fairly well with Bentham's description of *Geococcus pusillus*. The first of these offers some points of interest, which I will at once describe, whilst the nature of the other will be considered in its relationship to other similar plants observed elsewhere.

Stenopetalum sphærocarpum.

Under *Geococcus pusillus*, F. von Mueller included in the Ardrossan List of Plants, *op. cit.*, a dwarf state of this species, differing in one particular only from the normal condition in having cleistogamous flowers (though not observed by that botanist). The flowers are more or less closed by the adpression of the relatively large sepals, so that all the interior organs are concealed. Each petal has a filiform claw, spathulately expanded upwards, and terminated by a rather long filamental extension. The latter in the dried specimens is spirally coiled in a horizontal direction, and is included within the calyx. The capsules are prolific in seeds, and though the pedicels are recurved, yet they are not abnormally lengthened, so as to bring the fruit to the ground.

BLENNODIA CARDAMINOIDES, *Bentham.*

The second of the Ardrossan plants represents the "Geococcus-state" of this species. But before submitting evidences of such an attachment, I desire to discuss the advisability of the *Retention of the genus Blennodia*, R. Brown, 1849.

The majority of Australian botanists influenced by their compeer has accepted his dictum that *Blennodia* is made up of species of the genera *Sisymbrium* and *Erysimum*. A critical examination of the 10 species of the South Australian flora, collectively included under these two generic names, satisfies me that the venation of the capsule is not that proper to *Sisymbrium* ; as in all the species, there is only a midrib, without a lateral vein on each side. The midrib varies, however, in its prominence—being conspicuous in *B. filifolia*, slender in *B. trisecta*, inconspicuous in *B. lasiocarpa*, or obsolete in *B. canescens*, though in the related species *B. curvipes* there is a distinct keel on the capsular valve. There is no justification for the employment of *Sisymbrium* for some of our crucifers, and I take, therefore, this opportunity to refer my *S. procumbens* to *Blennodia* as *B. procumbens*, Tate, 1898. The seeds not distinctly in a single row separate *Blennodia* from *Erysimum* as also from *Sisymbrium*.

GEOCOCCUS PUSILLUS, *a dimorphic plant and of what one or more species?*

I have already referred to Bentham's perspicuity in regard to *G. pusillus*, which subsequent investigations have proved him to be correct. Following on, in the order of time, I find that Mueller in "Key to Victorian Plants," p. 131 (1888), under *Sisymbrium cardaminoides*, describes the "*Geococcus-state*" of the species in the following words :—"Or in a stemless state of this plant (fruits) very short, rather thick and turgid, singly forming on their stalks, and during maturation burying themselves in the ground ; the flowers of this state very minute." This implies that all the Victorian plants previously quoted as *G. pusillus* belong to *Blennodia cardaminoides*. In the following year the same author in the fourth supplement to his "Census of Australian Plants," indicates at p. 5 that "*Geococcus pusillus* = *Sisymbrium cardaminoides*," which implies that *G. pusillus*, Drummond, is a dimorphism of the quoted species. This may be true in the majority of cases, but in view of the fact that *Blennodia*, in the sense used by Bentham, is represented in W. Australia by the three following species only—*B. trisectum*, *B. Richardsii*, and *B. brevipes*, it is inconsistent to regard Drummond's plant as belonging to *B. cardaminoides*, the normal condition of which is not known to inhabit the same country as

Drummond's type. At the same time I must admit that the specific description of Drummond's plant well agrees with the South Australian examples of the "Geococcus-state" of *B. cardiminoides.*

Examples of so-called *Geococcus pusillus* have been studied by me from the following South Australian localities :—Ardrossan, *J. G. O. Tepper* ; Mount Remarkable, *C. F. Johncock* ; Craddock, *Central Agricult. Bureau.* They all agree in general characters with Bentham's diagnosis—in radical pinnatifid leaves, stemless, the fruits born singly on radical axillary reflected peduncles, burying the capsules in the ground. The flowers I have not seen. The capsule is cylindrical, at its longest about 7 mm., not exceeding 9 mm., and from four to five times as long as wide, the pedicels about 10 mm. long, broad and flat ; but the fruits are often deformed, some reduced to an ovoid outline of 3 by 2·5 mm., or even slightly less, this deformity may arise from the resistance to penetration offered by hard ground. Each fruit-valve flatly convex from a median keel, reticulately streaked on the sides and sparsely stellately-hairy, apex obtusely pointed.

Though the foliage is that of *Blennodia cardaminoides*, yet the other structures are not in agreement therewith. Thus the stigma is sessile, the pod is not curved (though this character is not constant in *B. cardaminoides*), and is not attenuated at the base, whilst its conspicuous midrib and the reticulate veining on the side are additional distinctions. These marked differences must be related to the habit of dimorphism ; inasmuch as I possess a plant of *B. cardaminoides* from Cooper Creek, which has four single-flowered short stalks (about 7 mm. long), some erect others horizontal, among the radical leaves ; otherwise it is normal, the single flowers are not yet advanced enough to show no more than a slight passage towards a fully developed "geococcus-state." However, a little has been gained in the direction of correlating the two very dissimilar states of *Blennodia cardaminoides*, which have in common virtually only leaf-form.

List of Birds Collected by the Calvert Exploring Expedition in Western Australia.

By Alfred J. North, C.M.Z.S., Ornithologist to the Australian Museum, Sydney. With Field Notes by G. A. Keartland, Naturalist to the Expedition.

[Read October 4, 1898.]

I have received from the South Australian Museum, Adelaide, for examination, an interesting collection of North-West Australian bird skins, prepared by Mr. G. A. Keartland. The collection was formed chiefly during the time Mr. Keartland had charge of the camp at the junction of the Fitzroy River and Margaret River, about forty-five miles from Derby, and while the leader, Mr. L. Wells, was absent in search of the missing members of his staff—Mr. C. F. Wells and Mr. G. Jones. Owing to the intense heat, and scarcity of water and feed for the camels, over 300 bird skins obtained prior to the main party leaving Separation Well, together with guns, tools, and clothing, had to be abandoned in the desert.

Unfortunately for science, the attempts of late years to wrest Nature's secrets from the arid inland regions of North-West Australia have been more or less attended with disaster. In 1886 Mr. E. J. Cairn, who was collecting natural history specimens on behalf of the Trustees of the Australian Museum about 100 miles inland from Derby, narrowly escaped losing his life. In the broad daylight his party was suddenly attacked by the natives, who were concealed behind some rocks, and the head of a spear passed through the fleshy part of one of Mr. Cairn's arms. Although suffering no further injury from the natives, misfortune still pursued him, for after weary months of toil, portion of his collection, consisting of many bird-skins, nests, and eggs, was lost in transit to the Museum, and was never recovered.

Early in the same year the late Mr. T. H. Bowyer-Bower left Sydney for Derby with a taxidermist, who had accompanied him from London. This gentleman and his assistant succeeded in forming a splendid collection, although part of it was destroyed during their absence one day from the camp through the grass catching fire, and burning one of their tents and everything in it. After spending nearly twelve months in the district, shortly before Mr. Bowyer-Bower left Derby, he contracted a malignant

fever, which, to the deep regret of all who knew him, terminated fatally a few days after his arrival at Port Darwin. These calamities are now overshadowed by the sad fate of the lost explorers of the Calvert Expedition, who perished from thirst in the desert. The indomitable perseverance, however, of the leader, Mr. L. Wells, in his heroic attempts to rescue his late companions, forms a bright page in the recently-added chapter to the history of Australian exploration.

Dr. E. P. Ramsay, in the Proceedings of the Linnean Society of New South Wales,* has enumerated the species contained in Mr. Cairn's and the late Mr. T. H. Bowyer-Bower's collections. The former, which consisted only of the recovered portion of the collection, contained examples of 66 species, and numbered among them were specimens of *Malurus coronatus* and *Emblema picta*, recorded, probably, for the first time since the types were described by Mr. Gould.

Although the extent of the late Mr. Bowyer-Bower's collection had been materially reduced by a disastrous fire, it was the largest ever obtained in North-West Australia, numbering 152 species. It was formed within a radius of 25 miles of Derby, and included in it a number of migratory and littoral species not represented in the present collection.

The abandonment near Johanna Springs of the first collection made by the Calvert Expedition is a most serious loss, especially to my indefatigable friend, Mr. Keartland, who joined the party purely for the love of the ornithological results it would yield. It is, however, a matter for congratulation that he was able to save his field notes.

The collection brought back by Mr. Keartland was formed between December 22, 1896, and May 1 of the following year, and numbers, exclusive of the nests and eggs, 167 specimens, referable to 59 species.

I had the pleasure of examining Mr. Cairn's and the late Mr. Bowyer Bower's collections, and note that many beautiful forms contained therein are absent from the present collection. One misses the lovely little *Malurus coronatus*, *Ephthianura crocea*, and *Poëphila mirabilis*, and also the duller-plumaged, but rarer, *Astur cruentus*.

On the other hand, several remarkable species, not included in either of the above collections, are now recorded for the first time from North-West Australia, notably the chastely-coloured *Spathopterus alexandræ*, obtained near Johanna Springs, and *Ptilotis keartlandi*, procured near Derby. The latter species was one of the novelties discovered by Mr. Keartland during the

* Ramsay, Proc. Linn. Soc., N.S.W., vol. I., Second Series, p. 1,085 (1886); *id.*, *op. cit.*, vol. II., Second Series, p. 165 (1887).

journey of the Horn Scientific Expedition in Central Australia. It could hardly be expected that the district in which the present collection was made would yield any but well-known forms, especially as the late Mr. Bowyer-Bower and his assistant had systematically worked the adjacent neighbourhood for nearly 12 months. Nevertheless, the collection, although comparatively small, is of great interest, as it has increased our knowledge of the range of several species, and contains the hitherto unknown eggs of *Lophophaps ferruginea*.

In the accompanying paper, as in the Report of the Horn Expedition, Mr. Keartland's notes on his observation of the different species in the field are placed between square brackets.

No. 1. Circus assimilis (Spotted Swamp Harrier).

Circus assimilis, Jard. & Selby, Ill. Orn., vol. I., pl. 51 (1826); Sharpe, Cat. Bds. Brit. Mus., vol. I., p. 63 (1874); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 165 (1886); North, Nests and Eggs, Austr. Bds., p. 1 (1889).

Circus jardinii, Gould, Bds. Austr., fol., vol. I., pl. 27 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 12 (1848).

An adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Wing, 17 inches.

[This beautiful Harrier was frequently met with in the course of our trip. Near Lake Way several were observed flying slowly near the ground, seeking their prey in the form of lizards, &c. Whilst collecting in the vicinity of the camel depôt on August 18, 1896, Mr. Chas. F. Wells pointed out a nest containing two eggs, from which he had just disturbed the bird. The nest was about 30 feet from the ground on an horizontal branch of a gum-tree. On September 25 Mr. L. A. Wells took two eggs slightly incubated from a nest situated in the forked branch of a gum-tree about 20 feet from the ground. They were somewhat rough-shelled, white, with slight brown stains as though soiled with coffee. On several occasions these birds were seen near the junction of the Fitzroy and Margaret Rivers. When in quest of food they seem very restless. I never saw one perch on a tree, but disturbed many engaged in devouring their prey in the long grass which abounds on the tributaries of the Fitzroy River.]

No. 2. Falco melanogenys (Black-cheeked Falcon).

Falco melanogenys, Gould, Proc. Zool. Soc. (1837), p. 139; *id.*, Bds. Austr., fol., vol. I., pl. 8 (1848); Sturt, Exped. Centr. Austr., vol. II., App. p. 14 (1849); Sharpe, Cat. Bds., Brit. Mus., vol. I., p. 385 (1874); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 166 (1887); North, Nests and Eggs, Austr. Bds., p. 16, pl. III., fig. 4 (1889).

One young female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[These falcons are numerous all through Kimberley, especially near water. They are known locally as the "Snake Hawk," but the specimen shot had been feeding on grasshoppers. As it is well known that these birds are generally found in rocky country, it is probable that the homes of those noted will be found in the Oscar, Leopold, and Barrier Ranges.

No. 3. Strix delicatula (Delicate Owl).

Strix delicatulus, Gould, Proc. Zool. Soc. (1836), p. 140; *id.*, Bds. Austr., fol., vol. I. pl. 31 (1848); Sturt, Exped. Centr. Austr., vol. II., App. p. 17 (1849).

Strix delicatula (*subsp.*), Sharpe, Cat. Bds. Brit. Mus., vol. II., page 297 (1875); North, Nests and Eggs, Austr. Bds., p. 24 (1889).

Strix delicatula, Ramsay, Proc. Linn. Soc., N.S.W., vol. II., 2nd series, p. 166 (1887).

An immature male, obtained at the camp, about five miles from the junction of the Fitzroy and Margaret Rivers.

[These beautiful birds were met with in the Mulga scrubs east of Lake Way, where they presented a most grotesque appearance as they gazed at the passing caravan. At the camel depôt several more were noted, and specimens obtained. These birds were all perched amongst the foliage of the trees. Whilst shooting at one of the creeks passed, Mr. C. F. Wells disturbed a pair from the hollow spout of a eucalypt, and on another occasion, at the Fitzroy River, I had sent a native to examine a hollow branch, when another pair flew out, striking him in the face with their wings as they escaped.]

No. 4. Ninox ocellata (Fawn-bellied Owl).

Chevéche ocellée, Hombr. and Jacq., Voy. Pôle Sud, Atlas, pl. 3, fig. 2 (1843).

Athene ocellata (Homb. et Jacq.) Jacq. et Pucher., Voy. Pôle Sud, tom. III., p. 51 (1853).

Ninox ocellata (subsp.), Sharpe, Cat. Bds. Brit. Mus., vol. II., p. 170 (1875).

One immature male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This specimen has the entire face snow-white, rendering the brown ear-coverts very conspicuous, the head and hind neck more strongly washed with ochraceous fawn, and the under parts slightly paler than adult examples from Port Essington. Total 11 inches, wing 8.6, outer tail-feathers 5, tarsus 1.45.

[I had only one opportunity of securing this species. Whilst collecting near the Fitzroy River, my blackboy noticed a pair perched just overhead. They gazed at us whilst he climbed to secure a Honey-eater's nest, and on his descending the tree, I shot one, the other escaping before I could reload. I was much struck with the manner in which these birds seemed to compress their feathers so as to make themselves appear remarkably small.]

No. 5. Ninox occidentalis (Western Winking Owl).

Ninox connivens-occidentalis, Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd. series, p. 1,086 (1886); *id.*, op. cit. vol. II., 2nd. series, p. 166 (1887).

A young male and a young female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This north-western form of *N. connivens* may be distinguished by the pale rufous-brown stripe down the centre of each feather of the under surface. The young resemble the adults in plumage.

[Although nocturnal in their habits, I found these birds were capable of keeping a sharp lookout in the brightest sunshine. On disturbing a pair near the Fitzroy River I shot the female. Her mate flew off, pursued by several Friar birds, Grallinas, Red-throated Honey-eaters, Kingfishers, and Wood Swallows, but, although his attention was somewhat absorbed in repelling their attacks, I had great difficulty in securing him after a chase of nearly a mile. These Owls are also numerous along the course of the Nerrima and Jilgelly Creeks, where they frequent the dense bushes near the waterholes, and feed on the small animals, birds, and reptiles which come to drink in the evening.]

No. 6. Cacatua galerita (Sulphur-crested Cockatoo).

Psittacus galeritus, Lath., Ind. Orn., vol. I., p. 109 (1790).

Cacatua galerita, Gould, Bds. Austr., fol., vol. V., pl. 1 (1848); Sturt, Exped. Centr. Austr., vol. II., App. p. 35 (1849); North, Nests and Eggs, Austr. Bds., p. 250 (1889); Salvad., Cat. Bds. Brit. Mus., vol. XX., p. 16 (1891).

One freshly-moulted adult female, some of the quills and tail-feathers being not full grown. This specimen is smaller than examples from other parts of Australia. Total length, 17 inches; wing, 11·8; tail, 7. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[During February a few of these birds visited the Fitzroy River, but they are regarded as rare in that locality. I shot one, which proved to be a female, evidently on the lookout for a nest, as the ovaries were well developed. This bird was much smaller in size than any of the species I have seen.]

No. 7. Calyptorhynchus macrorhynchus (Great-billed Black Cockatoo).

Calyptorhynchus macrorhynchus, Gould, Proc. Zool. Soc., 1842, p. 138 ; *id.*, Bds. Austr., fol., vol. V., pl. 8 (1848) ; Salvad., Cat. Bds. Brit. Mus., vol. XX., p. 110 (1891).

	Total Length.	Wing.	Tail.
Female, imm. sk.	22 in.	16·5	11·8
Female, imm. sk.	22 in.	16·2	11·7

Two immature females. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. In addition to the difference in size, the females of this species may be distinguished from those of *C. banksi* and *C. stellatus* by the greater extent of yellow in the cross-bars on the tail.

[These birds were first observed at Mullawa, and were subsequently seen on several occasions as they passed overhead, but at the Fitzroy River they were very numerous. During December they came in large flocks to a small lagoon near our camp, just before sunset and in the early morning. They spent some time on the ground after satisfying their thirst, during which they appeared to be feeding on the bulbs of a species of water-lily. Young birds were taken by the natives from the spouts of the eucalyptus on the Margaret River early in November.]

No. 8. Spathopterus alexandræ (Princess of Wales' Parrakeet).

Polytelis alexandræ, Gould, Proc. Zool. Soc., 1863, p. 232.

Polytelis alexandræ, Gould, Suppl. Bds. Austr., pl. 62 (1869); Salvad., Cat. Bds. Brit. Mus., vol. XX., p. 479 (1891) ; North, Rec. Austr. Mus., vol. II., p. 19, pl. 2., fig. 5 (1892) ; Sclater, List Vert. Anim. Zool. Gard., 9th ed., p. 358 (1896).

Spathopterus alexandræ, North, Ibis, p. 339 (1895) ; Spencer, Horn Exped. Centr. Austr., part 1 *Narr.* pp. 100, 147 (1896) ; North and Keartl., op. cit., pt. 2, Zool., p. 69, pl. 5 (1896).

A female, obtained two miles S.W. of Johanna Springs. Specimens were also procured N.W. of Mount Bates, before the party separated, but were left in the desert when the collections were abandoned. It is interesting to extend the range of this beautiful Parrakeet to West Australia.

[On the flying trip made by Messrs. L. A. Wells and G. L. Jones during August they found numbers of these birds about one hundred miles North-East of Mount Bates, and on several subsequent occasions, but when we traversed the same track about five weeks later I only saw them twice, and succeeded in shooting one pair. Again in April a pair were seen within two miles of Johanna Springs, and several days later a flock of about 20 was noted in the same neighbourhood. They appear to be

confined to the most dreary desert country, and must either travel long distances to water or require very little of it. In the stomachs of those opened the seed of the *Triodia* predominated. When noted they were disturbed whilst feeding amongst the "*Spinifex*," and usually perched on the nearest tree irrespective of species. Mr. Wells has since reported seeing several within a few miles of the Fitzroy River.]

No. 9. Ptistes erythropterus (Red-winged Lory).

Psittacus erythropterus, Gmel., Syst. Nat., vol. I., p. 344 (1781).

Aprosmictus erythropterus, Gould, Bds. Austr., fol., vol. V., pl. 18 (1848).

Ptistes erythropterus, North, Nests and Eggs, Austr. Bds., p. 255. pl. 14, fig. 5 (1889); Salvad., Cat. Bds., Brit. Mus., vol. XX., p. 481 (1891).

Three adult males, one adult female, one young male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar in colour and size to examples from Eastern Australia, except in having the tail-feathers slightly more yellowish-green. Two eggs, taken from a hollow trunk of a tree near the Fitzroy River, March 17, 1897, are rounded ovals in form, white, and slightly nest-stained, the measurents of both being alike, 1·18 x 0·97 inch. Gould records in his "Birds of Australia" that he met with this species on the Liverpool Plains, but neither Dr. Ramsay in his "Tabular List of Australian Birds," nor Count Salvadori in Catalogue XX. of British Museum include New South Wales in the habitat of the Red-winged Lory. These birds are by no means uncommon in the Northern and North-Western parts of the colony. I met with them on Namoi River in November, 1896, and I have known of their eggs being taken from nesting places in trees on the Bogan, Macquarie, and Warrego Rivers.

[This beautiful Lory was only found in the vicinity of the Fitzroy River, where it appears to be fairly plentiful. Seldom more than two or three birds are seen at a time, excepting at the *Ficus*-trees which happen to be in fruit, and then as many as half-a-dozen are to be found devouring the small berries, of which they are very fond. Probably in the latter case it is only a family group. On March 18, Mr. Arch. Blyth pointed out a tree into which he had noticed one of these birds enter. As we approached the tree a bullock-whip was cracked several times, but the bird sat close until the limb was struck, when she emerged from a hollow branch about 40 feet high. A native was sent up, but holes had to be cut along the horizontal limb and down the trunk until the nest was located, about six feet from the ground.

The four partly-incubated eggs it contained were simply deposited on the decayed wood at the bottom of the hollow.]

No. 10. Ptilosclera versicolor (Red-crowned Lorikeet).

Trichoglossus versicolor, Vigors, in Lear's Ill. Parr., pl. 36 (1832); Gould, Bds. Austr., fol., vol. V., pl. 51 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., Second Series, p. 1,095 (1886).

Ptilosclera versicolor, Salvad., Cat. Bds. Brit. Mus., vol XX., p. 66 (1891).

Three adult males, two adult females, one young male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The females are smaller, and duller in colour, than the males. Immature males resemble the adult female.

[During November and the early part of December immense flocks of these beautiful Lorikeets were seen passing over our camp in the early morning, but, before January 1, they all disappeared and were not again seen. In habits and voice they closely resemble the Musk Lorikeet (*T. concinnus*), and are not easily scared from the trees on which they happen to be feeding. On one occasion I fired five shots before they took flight. They used to visit one or two *Eucalyptus*-trees near our camp soon after sunrise, and by their loud cries quickly attracted attention. There they were found actively climbing and clinging to the foliage, extracting the honey from the blossom in such a manner as to convey the idea that they were anxious to be off again to some distant part. The female is scarcely so bright in plumage as the male. I was informed that they breed in the hollow limbs of the trees on the margin of the Margaret River.]

No. 11. Cacomantis flabelliformis (Fan-tailed Cuckoo).

Cuculus flabelliformis, Lath., Ind. Orn. Suppl., p. xxx., (1801); Ramsay, Proc. Linn. Soc. N.S.W., vol. II, 2nd. series, p. 170 (1887).

Cuculus cineraceus, Gould, Bds. Austr., fol,. vol. IV., pl. 86, (1848).

Cacomantis flabelliformis, North, Nests and Eggs, Austr. Bds. p. 244, pl. 13, fig. 7 (1889); Shelley, Cat. Bds. Brit. Mus., vol. XIX., p. 266 (1891).

A nestling. Wing 2·65 inches. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

No. 12. Scythrops novæ-hollandiæ (Channel-billed Cuckoo).

Scythrops novæ-hollandiæ, Lath., Ind. Orn., p. 141 (1790); Gould, Bds. Austr., fol., vol. IV. pl. 90 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd. series, p. 1,094 (1886); North, Nests and Eggs, Austr. Bds., p. 248 (1889); Shelley, Cat. Bds. Brit. Mus., vol. XIX., p. 330 (1891).

An adult female. Mount Campbell near Fitzroy River, seven miles west of camp. This species has a very wide range. It is found in the Moluccas, Celebes, New Guinea and adjacent islands, Northern and North-Western Australia, Eastern Queensland, and New South Wales, and occurs as a rare straggler in Tasmania.

[At the approach of the tropical rain in January the *Scythrops* made its appearance in the early morning, always coming from the west and going east. Their loud notes, which they utter when flying, were always noticed by the Crows at our camp, which at once assembled and attacked the intruder. Then a battle royal ensued. Two or more Crows attacked simultaneously, and the sharp snap of their bills might be heard for some distance. When the Channel-bill was chased for about a mile the Crows returned to their quarters. On Mount Campbell a pair of *Scythrops* frequently resorted to a fig-tree to feed. I shot the female on 3rd March, and found the stomach full of figs. The ovaries were well developed, and contained three yolks, varying in size, one being as large as a small cherry, the other two slightly less. Near the Margaret River the natives took two young ones from a Crow's nest near the homestead, which the *Scythrops* had frequently visited. They are locally know as "Stormbirds."

No. 13. Centropus phasianus (Pheasant-Coucal).

Cuculus phasianus, Lath., Ind. Orn., vol. II., Suppl., p. xxx., (1801).

Centropus phasianus, Gould, Bds. Austr., fol., vol. IV., pl. 92 (1848); North, Nest and Eggs, Austr. Bds., p. 249 (1889); *id.*, Rec. Austr. Mus., vol. II., p. 17 (1892); Shelley, Cat. Bds. Brit. Mus., vol. XIX., p. 340 (1891).

Centropus melanurus, Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,094 (1886).

Three adult males, two adult females. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to examples from Eastern Australia. The wings of the males vary in length from 9·8 to 10·25 inches; those of the females from 10·6 to 11·4.

[Amongst the long grass near the Fitzroy River these birds were found either singly or in pairs, but after rain six or seven might be seen assembled on a patch of burnt ground. All those shot during January and February had a few brown feathers scattered through the black on the head, neck, and breast, a fact which suggests either that all those shot were changing from the immature to the adult stage, or that they are subject to variations of plumages at different times of the year. The females were invariably larger than the males, but in other respects the sexes were alike. Occasionally they were found

amongst the branches of the gum-trees along the creeks. At early morning and about sunset their dual notes revealed their presence. The natives of three different tribes call this bird the "Book Book."]

No. 14. Halcyon sanctus (Sacred Kingfisher).

Halcyon sanctus, Vig. and Horsf., Trans. Linn. Soc., vol. XV., p. 206 (1826); Gould, Bds. Austr., fol., vol. II., pl. 21 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,086 (1886); North, Nests and Eggs, Austr. Bds., p. 37 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XVII., pp. 267, 500 (1892).

One adult male, two immature males. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to examples from Eastern Australia. Wing of adult male 3·6 inches.

A set of three eggs, taken from a hollow limb about 30 feet from the ground in January, 1897, are nearly round, pure white, and lustreless. They are slightly smaller than examples taken in New South Wales, and measure as follows:—(A) 0·98 x 0·85 inch; (B) 0·97 x 0·81 inch; (C) 0·98 x 0·83 inch.

[Numbers of these birds were seen in the timbered country around the telegraph station at Fitzroy River, and all along the course of that stream. Their notes were not only totally different from those of the same species found in other parts of the Continent, but the birds and their eggs were so much smaller as to suggest the possibility of a different species. During December and January a number of their nests were found in the hollow branches of the trees near the river. Four eggs constitute the clutch.]

No. 15. Halcyon pyrrhopygius (Red-rumped Kingfisher).

Halcyon pyrrhopygia, Gould, Proc. Zool. Soc. (1840), p. 113; *id.*, Bds. Austr., fol. vol., II., pl. 22 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 20 (1849); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd. series, p. 1,086 (1886).

Halcyon pyrrhopygius, North, Nests and Eggs, Austr. Bds., p. 38 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XVII., p. 258 (1892); North and Keartl,, Horn Sci. Exped. Cent. Austr., part II, *Zool.*, p. 66 (1896).

One adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This species is found all over the dry inland portions of Australia.

[The first specimen was obtained near Cue. Subsequently they were found wherever suitable shelter existed until we reached the Fitzroy River, where others were shot. They are not numerous in the North.]

No. 16. Dacelo leachii cervina (Fawn-breasted Kingfisher).

Dacelo cervina, Gould, Bds. Austr., fol., vol. II., pl. 28 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., Second Series, p. 1,086 (1886); North, *op. cit.*, vol. IV., Second Series, p. 1,024 (1889).

Dacelo cervina (subsp.), Sharpe, Cat. Bds. Brit. Mus., vol. XVII., p. 207 (1892).

Two adult females, one adult male, one young male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The subspecific distinction accorded to the northern and north-western race of *D. leachii* does not hold good in many instances. I have specimens now before me from Derby, N.W. Australia, that, except for their slightly-smaller size cannot be distinguished from examples of *D. leachii* from Port Denison. Specimens of *D. leachii* from Cairns, North-Eastern Queensland, have a slight fulvous wash on the under-surface, and are precisely similar to birds obtained at Broome, North-West Australia. Farther north they become smaller and darker. All the examples from Port Essington in the Australian Museum are typical *D. cervina*. They have tawny-buff breasts, darker-blue quills and tail, and smaller white tips to the tail-feathers. An adult male and female from Roeburne, North-West Australia, are slightly paler than the specimens from Port Essington, and are furthermore distinguished by the very narrow brown streaks down the centres of the feathers on the crown of the head. Examples obtained intermediate between these two localities vary considerably in the depth of the buff-coloring on the under-parts.

[These birds were heard and seen for the first time by our party along the Fitzroy River, where they were numerous. Although in flight and shape *D. cervina* so closely resembles *D. gigas*, its note is totally different, and conveys an impression that its vocal organs are out of gear, as it gives forth a succession of short jerky sounds bearing no resemblance to the hearty laugh of *D. gigas*. It has also a stronger bill, and is much more brilliant in its markings on the wings. An adult female shot near Jilgelly Creek had nearly the whole of its back a beautiful pale metallic blue.

No. 17. Eurystomus australis (Australian Roller).

Eurystomus australis, Swains., Anim. in Menag., p. 326 (1827); Gould, Bds. Austr., fol., vol. II., pl. 17 (1848); Sharpe, Cat. Bds. Brit. Mus., vol. XVII., p. 36 (1892).

Eurystomus pacificus, Ramsay, Proc., Linn. Soc., N.S.W., vol. II., 2nd series, p. 166 (1887); North, Nests and Eggs Austr. Bds., p. 35 (1889).

One nearly adult female. Obtained in a tree near the Fitzroy River, about five miles from the camp.

[Whilst at Fitzroy River I was frequently told of a very rare bird, which was described as black, with a white spot in each wing, and advised to keep a sharp lookout for it along the course of the rivers. I did so, with the result that the *rara avis* proved to be the Roller or Dollar bird. They were rather shy, and generally perched on the top branches of the highest trees. As they were all in heavy moult at the time (January), I did not shoot many.

No. 18. Merops ornatus (Australian Bee-eater).

Merops ornatus, Lath., Ind. Orn., vol. II., Suppl., p. 35 (1801); Gould, Bds. Austr., fol., vol. II., pl. 16 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 19 (1849); Ramsay, Proc. Linn. Soc., N.S.W., vol. II., 2nd series, p. 166 (1887); North, Nests and Eggs Austr. Bds., p. 34 (1889); Sharp, Cat. Bds. Brit. Mus., vol. XVII., p. 74 (1892).

Three young females. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[Although the Bee-eater is generally found tunnelling in the banks of creeks at breeding time in North-West Australia, they more frequently burrow in the sand on the open plain. During January they became quite a feature in the bird-life around our camp, and I had many opportunities of examining most gorgeous specimens as they flew past, or permitted me to approach within a few yards of the trees on which they were perched. The majority of them appeared to be young ones, but adult birds in full livery were frequently noted.]

No. 19. Eurostopodus argus (Spotted Nightjar).

Eurostopodus guttatus, Gould (*nec.* Vig. and Horsf.), Bds. Austr., fol., vol. II., pl. 8 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,097 (1886); North, Nests and Eggs Austr. Bds., p. 27, pl. 11, fig. 2 (1889).

Eurostopus argus, Hartert, Cat. Bds. Brit. Mus., vol. XVI., p. 608 (1892).

One female in the moult. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. In vol. XVI. of the "Catalogue of Birds in the British Museum," Mr. Hartert points out that the type specimen of the Nightjar, described by Vigors and Horsfield under the name of *Caprimulgus guttatus* is only the young of *Eurostopodus albigularis*.

[During the early part of our journey the peculiar note of this bird gave rise to a considerable amount of speculation as to its origin, but at Mount Campbell I not only got the required information from the natives, but also satisfied myself by shooting the bird whilst uttering it. This note consists of a "caw, caw,

caw, gobble, gobble, gobble." In the whole of the desert these birds are seen soon after sunset skimming over the tops of the spinifex in search of insects, but camp-fires possess a strong attraction for them in the form of winged insects attracted by the light. Whilst on watch on the night of August 17, I counted ten birds flying round the burning spinifex at one time. Although seen far into the desert at night, they prefer rocky country in which to pass the day. On the hillside, near Mount Campbell, I disturbed fourteen birds from about half an acre of ground, and subsequently flushed several lots of five or six, but never saw one perch. They appear to spend all their time on the wing or ground. They lay one egg on the bare ground, without making any nest. The egg is a pale-green, lightly spotted with black.]

No. 20. Artamus leucogaster (White-bellied Wood-Swallow).

Ocypterus leucogaster, Valenc., Mem. Mus. d'Hist. Nat., tom. VI., p. 21, pl. 7., fig. 2 (1820).

Artamus leucopygialis, Gould, Bds. Austr., fol. vol., II., pl. 33 (1848).

Artamus leucogaster, North, Nests and Eggs, Austr. Bds., p. 43 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 3 (1890).

One adult and one young male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The young male has the bill brown, all the feathers of the back, scapulars, and greater wing-coverts tipped with rich buff, those on the centre of the throat and the tips of the quills and the tail whitish.

[A few of these birds were seen along the course of the Fitzroy River, and near our camp I found them in compauy with *A. melanops*. On February 15 a pair were seen feeding their young brood. They were not by any means numerous, being generally found in pairs. They seem to be of a most affectionate disposition, and, when not engaged in soaring overhead or seeking food, might be observed perched side by side on some dry twig pluming each other's feathers. They were never seen far from water.]

No. 21. Pardalotus rubricatus (Fawn-browed Diamond Bird).

Pardalotus rubricatus, Gould, Proc. Zool. Soc., (1837), p. 139; *id.*, Bds. Austr., fol., vol. II., pl. 36 (1840); Sharpe, Cat. Bds. Brit. Mus., vol. X., p. 60 (1885); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,087 (1886); North, Nests and Eggs, Austr. Bds., p. 54 (1889); North and Keartl., Rep. Horn Sci. Exped. Cent. Austr., part 2, Zool., p. 69 (1896).

One adult male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to examples from Northern and Central Australia.

[The singular soft note of this little Pardalote was first heard in the Eucalypts on the margin of a creek near our camel depôt during August and Mr. C. F. Wells soon procured a nice specimen in full plumage. Others were frequently shot, but they were not so brilliant in colour as those I obtained in Central Australia in 1894.]

No. 22. Lalage tricolor (White-shouldered Caterpillar-eater).

Ceblepyris tricolor, Swains., Zool. Journ., vol. I., p. 467 (1825).
Campephaga humeralis, Gould, Bds. Austr., fol., vol. II., pl. 63 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 23 (1849); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,088 (1886).
Lalage tricolor, North, Nests and Eggs Aust. Bds., p 78 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. IV., p. 92 (1879).

One adult male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This is a migratory species, visiting New South Wales about the end of September, and departing again in February. It is found in most parts of the Australian Continent.

[Whilst near Lake Way, in July, a number of young birds of this species were seen, and as the season progressed we found the immature males exchanging their modest brown garb for the bright black-and-white of the adult male. Near the Fitzroy River during February they were breeding, and several clutches of eggs taken, which presented considerable variation in colour, some being heavily blotched with red on a pale-green ground, whilst others were streaked and blotched with dark-brown on a rich-green ground. The nests, which were small for the size of the birds, were built of fine grass, moss, cobwebs, and scraps of bark in the horizontal forks of the Eucalypt- and Bauhinia-trees, in such a manner as to make their discovery somewhat difficult. They were so shallow that the least shake dislodged the eggs.]

No. 23. Collyriocincla brunnea (Brown Shrike-Thrush).

Colluricincla brunnea, Gould, Proc. Zool. Soc., 1840, p. 164; *id.*, Bds. Austr., fol., vol. II., pl. 76 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 167 (1887); North, Nests and Eggs Austr. Bds., p. 81 (1889).

One adult male only. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This species agrees with Gould's figure and description of this species. In the Catalogue of Birds in the British Museum, Dr. Sharpe describes the adult as having a distinct white eyebrow, like *C. superciliosa*, Masters, which Dr. Sharpe includes as a synonym of *C. brunnea*. None of our adult males from Port Essington and Derby, in the

Australian Museum Collection, have any indication of white eyebrows, but it is apparent in a young male in the Macleay Museum. Dr. Sharpe's *C. pallidirostris* agrees with the female of *C. brunnea*, but of which he has omitted to give a description. Gould also only describes the male, but figures the two sexes in his Birds of Australia.

[Near Kurrajong Creek this bird was first seen, its well-known note attracking attention to it as it flew from tree to tree along the course of the creek. During February a pair hatched their brood near our camp on the Fitzroy River, and afforded considerable amusement by the manner in which they fluttered near my dog to divert its attention from the young ones.]

No. 24. Oreoica cristata (Crested Bell-bird).

Turdus cristatus, Lewin, Bds. New Holl., pl. 9 (fem.).

Oreoica gutturalis, Gould, Bds. Austr., fol. vol. II., pl. 81 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 23 (1849).

Oreoica cristata, Gadow, Cat. Bds. Brit. Mus., vol. VIII., p. 174 (1883); North, Nests and Eggs Austr. Bds., p. 70, pl. 8., fig. 6 (1889); Stirling and Zietz, Trans. Roy. Soc. South Austr., vol. XVI., p. 157 (1893); North and Keartl. Rep. Horn Sci. Exped. Centr. Austr., part 2, *Zool.* p. 73 (1896.)

One adult male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. With the exception of the extreme northern portions, this species is found all over the Australian Continent.

[The Oreoica was found scattered from Mullawa to the Fitzroy River. Although they were most plentiful in the vicinity of water, at times they were seen or heard on the sandhills of the desert far from it. Their nests were also frequently noted in the Corkbark and other trees in the valleys where they had probably been built soon after rain, but were all abandoned at the time of our visit. The well-known ventriloquial accomplishment of this bird afforded frequent amusement to our party. One perched within a few yards of our camp was watched for nearly an hour, and, as it turned its head, it appeared to throw its voice in different directions.]

No. 25. Malurus leucopterus (White-winged Superb Warbler).

Malurus leucopterus, Quoy et Gaim., Voy de l'Uranie, Zool., p. 108, pl. 23, fig. 2 (1824); Gould, Bds. Austr., fol., vol. III., pl. 25 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 25 (1849); Sharpe, Cat. Bds. Brit. Mus., vol. IV., p. 290 (1879); North, Nests and Eggs Austr. Bds., p. 116 (1889); North and Keartl., Rep. Horn Sci. Exped. Cent. Austr., part II., *Zool.*, p 79 (1896).

One adult male and female. Johanna Springs. This species is also distributed over the southern half of the Australian Continent. The type was obtained by M. M. Quoy and Gaimard on Dirk Hartog Island, Shark Bay, West Australia.

No. 26. Malurus cruentatus (Crimson-backed Warbler).

Malurus cruentatus, Gould, Proc. Zool. Soc. (1839), p. 143; Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,090 (1886); North, Nests and Eggs Austr. Bds., p. 118 (1889).

Malurus brownii, Gould, Bds. Austr., fol., vol. III., pl. 27 (1848).

Malurus dorsalis, Sharpe, Cat. Bds. Brit. Mus., vol. IV., p. 296 (1879).

Seven adult males, two adult females. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The males are of a deeper red on the backs than examples from Cairns and Cape York. Similar specimens were obtained by the late Mr. T. H. Bowyer-Bower.

A nest of this species, taken from a low bush, is a dome-shaped structure with an entrance near the top. It is rather loosely put together, and is formed throughout of very fine dried grasses and strips of white bark intermingled, with the covering of some composite plant. Externally it measures two inches and a-half in diameter by four inches and a-half in height. Eggs, three in number, white, finely dusted with pinky-red markings over the entire surface of the shell. Length (A) 0·6 x 0·5 inch, (B) 0·62 x 0·44 inch, (C) 0·6 x 0·44 inch. In another set of four the markings are slightly larger and are confined principally to the thicker end of the egg, and in one specimen they are confluent and form a well-defined zone.

[This delicate but gorgeous little bird was first noted near the junction of the Fitzroy and Margaret Rivers. Although usually found in long grass and undergrowth, it occasionally resorts to the larger trees, and one specimen was shot from a branch 50 feet high. It is very tame, and easily approached. Unlike most species of this genus, the present species usually constructs its nest some distance from the ground. Those found by Mr. Wells and myself were located in either what is known as the Peach-bush or Bauhinia-tree, and four to ten feet from the ground. The nests are built of fine dry grass, with a rather large opening near the top. The clutch of eggs, three or four in number, show considerable variation in colour and markings, but they have usually a fleshy-white ground, more or less spotted with red, which in some cases forms a zone.]

No. 27. Smicrornis flavescens (Yellow-tinted Scrub Tit).

Smicrornis flavescens, Gould, Proc. Zool. Soc., 1842, p. 134; *id.*, Bds. Austr., fol., vol. II., pl. 104 (1848); Masters, Proc. Linn. Soc., N.S.W., vol. II., p. 272 (1877); Sharpe, Cat. Bds. Brit. Mus., vol. IV., p. 210 (1879); Ramsay, Proc. Linn., N.S.W., vol. I., p. 1,889 (1886); North and Keartl., Rep. Horn Sci. Exped. Centr. Austr., part II., *Zool.*, p. 84 (1896).

Four adult males and one female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to examples from Northern and Central Australia.

[This beautiful little songster was frequently noted near the junction of the Fitzroy and Margaret Rivers, where it might be seen fluttering and hopping amongst the foliage of the Eucalypt trees or saplings. The sexes are alike in plumage and size].

No. 28. Pœcilodryas cerviniventris (Grey-breasted Robin).

Petroica? cerviniventris, Gould, Proc. Zool. Soc., p. 221; *id.*, Bds. Austr., fol., suppl., pl. 15 (1869).

Pœcilodryas cerviniventris, Sharpe, Cat. Bds. Brit. Mus., vol. IV., p. 242 (1879); Ramsay, Proc. Linn. Soc., N.S.W., vol. II., 2nd series, p. 167 (1887).

One adult male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[This bird was only seen in the dense mangrove scrub on the margin of the Fitzroy River, where its loud note betrayed its presence. On the first January I saw a pair of young ones, which had apparently just left the nest, being fed by their parents. Although several were shot they became so quickly decomposed by the heat that I was unable to obtain more than one skin. The sexes are alike in plumage].

No. 29. Mirafra horsfieldi (Horsfield's Bush-Lark).

Mirafra horsfieldi, Gould, Proc. Zool. Soc., 1847, p. 1; *id.*, Bds. Austr., fol., vol. III., pl. 77 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,098 (1886); North, Nests and Eggs Austr. Bds., p. 159 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 604 (1890).

One female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Slightly smaller than examples obtained in New South Wales, and approaching in colour the South Australian bird, separated by Dr. Sharpe under the name of *M. secunda*.

Four eggs taken in February, 1897, from a nest built under a tuft of grass, are of a pale-yellowish-grey ground colour, thickly covered with numerous yellowish-brown freckles and faint underlying dots of slaty-grey. Length, (A) 0·8 x 0·57 inch,

(B) 0·75 x 0·55 inch, (C) 0·77 x 0·57 inch, (D) 0·77 x 0·57 inch. Another specimen has the ground-colour of a clear greyish-white, and the markings larger and darker. Length, 0·8 x 0·57 inch.

[On the grassy flats, which extend for some distance on each side of the Fitzroy River, these birds are so numerous as to convey the idea that the headquarters of the species is in that locality. When we arrived at the lagoon near the river mentioned on November 6, I was surprised at their numbers. As we passed along a constant succession of birds kept rising from the ground and flying to the right and left of our line, but seldom went more than 20 yards before they again settled. It was impossible to throw a stick in any direction without disturbing several. Around the lagoon they were found in such numbers as to remind one of sparrows in a dry thistle field. They were very plentiful near the Fitzroy River Telegraph Station and at Mount Campbell, where they were found breeding in February. Their nests are usually placed near a small tussock of grass, or in a slight hollow formed by the pressure of a horse's foot; the material used to line them with is fine grass. The eggs are beautifully glossy, the ground being a pale-stone colour, almost obscured with brown spots. Four is the usual clutch.]

No. 30. Bathilda ruficauda (Red-tailed Finch).

Amadina ruficauda, Gould, Proc. Zool. Soc., 1836, p. 106.

Estrelda ruficauda, Gould, Bds. Austr., fol., vol. III., pl. 84 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,090 (1886).

Bathilda ruficauda, Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 374 (1890).

Four adult males, four adult females, four immature males. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Apparently very common. The females may be distinguished by their duller plumage, the less extent of crimson on the face and head, and the larger white spots on the throat and sides of the body. Young birds when first assuming the plumage of the adult have the white spots on the under-surface very much larger than when they attain their full livery.

Three eggs taken in March, 1897, from a dome-shaped nest constructed entirely of green grass, are pure white. Length, (A) 0·57 x 0·41 inch, (B) 0·57 x 0·43 inch, (C) 0·6 x 0·42 inch.

[These birds were only found in the vicinity of the telegraph line, near the junction of the Fitzroy and Margaret Rivers, where they appeared to be permanently located. They were generally seen in small flocks. A nest of this species, from which I shot the bird, was flask-shaped, and built entirely of fresh, green grass, from which the colour had not had time to fade. It contained five white eggs.]

No. 31. Stictoptera annulosa (Black-rumped Finch).

Amadina annulosa, Gould, Proc. Zool. Soc., 1839, p. 143.

Estrelda annulosa, Gould, Bds. Austr., fol., vol. III., pl. 81 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,090 (1886).

Stictoptera annulosa, North, Nests and Eggs Austr. Bds., p. 161 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 314 (1890).

An adult male and female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

Four eggs taken from a dome-shaped nest of dried grasses in March, 1897, are white, with an almost imperceptible tinge of blue.

Length—(A) 0·55 x 0·41 inch, (B) 0·55 x 0·38 inch, (C) 0·54 x 0·4 inch, (D) 0·55 x 0·4 inch. The eggs of this Finch are the smallest of all our Australian birds.

[This pretty Finch was only seen near the Fitzroy River, where it was breeding during February and March. By a close observation of the material used it is possible to determine to which species of Finch the nest belongs. The Ringed Finch usually chooses a site in some drooping branch about 10 ft. from the ground. In the case of those examined the outer covering was invariably very coarse—dead grass loosely woven together—but the lining was of the finest silver-grass, and a marvel of neatness. Six eggs form the usual clutch. Although some were perfectly white, one clutch from which I caught the bird had a faint bluish tinge, similar to those of the Chestnut-eared Finch.]

No. 32. Munia pectoralis (White-breasted Finch).

Amadina pectoralis, Gould, Proc. Zool. Soc. (1839), p. 127.

Donacola pectoralis, Gould, Bds. Austr., fol., vol. III., pl. 95 (1848).

Donacicola pectoralis, Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,091 (1886).

Munia pectoralis, Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 354 (1890).

An adult male and female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. This species is also found in the neighbourhood of Normanton.

[This Finch was only seen between the Telegraph Station and the Margaret River. It proved very shy, and although frequently disturbed whilst feeding amongst the long grass, or seen flying from tree to tree, only two or three were shot.]

No. 33. Pœphila acuticauda (Long-tailed Grass Finch).

Amadina acuticauda, Gould, Proc. Zool. Soc., 1839, p. 143.
Pœphila acuticauda, Gould, Bds. Austr., fol., vol. III., pl. 90 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,091 (1886); North, Nests and Eggs Austr. Bds. p. 167 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 375 (1890).

Three adult males, one adult female. Shot in the forest timber near Derby. This species is confined to the Northern and North-western portions of the Continent. Live specimens brought to Sydney by Mr. Burton, who accompanied the late Mr. T. H. Bowyer-Bower on his collecting expedition to North-West Australia, bred readily in confinement.

[This Finch was seen for the first time by our party near the Fitzroy River as we approached Derby, and at the wells which supply the latter place with water. The birds are very tame, and easily caught by simply covering the troughs and placing a dish of water under a frame covered with cheese-cloth. Several brought down alive are thriving in captivity].

No. 34. Neochmia phæton (Crimson Finch).

Fringilla phœton, Homb. et. Jacq., Ann. des Sci. Nat., tom. VI., p. 314 (1841).
Estrelda phœton, Gould, Bds. Austr., fol., vol. III., pl. 83 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,091 (1886).
Neochmia phœton, North, Nests and Eggs Austr. Bds., p. 388 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 389 (1890).

Two adult males, one adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar te examples from Eastern Queensland.

Six eggs taken from a flask-shaped nest of coarse grasses in March, 1897, are pure white. Length—(A) 0·63 x 0·45 inch, (B) 0·6 x 0·47 inch, (C) 0·6 x 0·5 inch, (D) 0·6 x 0·47 inch, (E) 0·6 x 0·47 inch, (F) 0·67 x 0·45 inch.

[At each of the homesteads near the junction of the Fitzroy and Margaret Rivers these birds make their appearance during December, and immediately after the rainfall in January commence building their nests. At the Police Camp there were eight pairs of birds, which had located their structures on the plates of the verandah. Others had buried their nests in the reedy thatch of the stable. At Mr. Blyth's Camp they were nesting under the eaves of the thatch, and the birds were so tame as to hop about the ground close to where we sat at breakfast. Although two birds were taken off their eggs and handled, they

returned to their nests immediately they were liberated. At Mr. Harris's quarters that gentleman showed me an old nest fixed in a bundle of wire hanging on the wall in his storeroom, which was an enclosed galvanised-iron building without windows. The birds had to enter under the corrugations in the iron in front, and fly across the room. The birds usually disappear again as soon as their young take wing. The material used for the exterior of the nests is coarse outer blades of grass, so large that it is surprising how they carry it, but the lining is fine and soft. Six pure white eggs constitute the clutch. I never saw nests belonging to this species on trees or bushes.]

No. 35. Emblema picta (Painted Finch).

Emblema picta, Gould, Proc., Zool., Soc. (1842), p. 17; *id.*, Bds. Austr., fol., vol. III., pl. 97 (1848); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,092 (1886); Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 295 (1890); North and Keartl., Rep. Horn Sci. Exp., Centr. Austr., part II., *Zool.*, p. 88 (1896); North, Rec. Austr. Mus., vol. III., p. 14 (1897), N.S.W.

Four adult males, one female. Johanna Springs.

During the prolonged drought of 1896 in New South Wales three adult males of this species were obtained within 20 miles of Sydney.

[This rare Finch was first seen and shot at Johanna Springs, where they came in company with the Chestnut-eared Finch to quench their thirst. They were very shy, and single specimens were only procured at the sacrifice of many of their companions. They were afterwards seen near the hospital at Derby, and when the steamer "Australind" was off Broome five Painted and two Chestnut-eared Finches perched in the rigging and kept flying about the vessel for some time. They were seen in large flocks.]

No. 36. Chlamydodera nuchalis (Great Bower-bird).

Ptilonorhynchus nuchalis, Jard. and Selby, Ill. Orn., vol. II., pl. 103.

Chlamydera nuchalis, Gould, Bds. Austr., fol., vol. IV., pl. 9, (1848).

Chlamydodera nuchalis, Sharpe, Cat. Bds. Brit. Mus., vol. VI., p. 391 (1881); Ramsay, Proc. Linn. Soc., N.S.W., vol. II., 2nd series, p. 169 (1887).

Two fully adult females, two not adult females, one young female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. It is remarkable that all the specimens obtained are females. It would be interesting to know if the adult males of this species entirely lose their rose-pink nuchal plumes for a period during the moulting season.

[Soon after reaching the Fitzroy River in November I secured a young bird of this species, and on mentioning the matter to several gentlemen at camp, was informed that a pair had been taken from the nest by a black boy a few weeks previously. Subsequently specimens were obtained at the horse-trough near the well, where they came frequently to drink and bathe. Their chief food seems to be a small black native fig, and wherever that fruit existed on the Fitzroy River the peculiar note of the Bower-bird was frequently heard. Several of their bowers which were discovered contained the usual collection of bleached bones, shells, bits of glass, and parrot feathers.]

No. 37. Pomatostomus rubeculus (Red-breasted Pomatostomus).

Pomatorhinus rubeculus, Gould, Proc. Zool. Soc. (1839), p. 144; *id.*, Bds. Austr., fol., vol. IV., pl. 21 (1848); Sharpe, Cat. Bds. Brit. Mus., vol. VII., p. 421 (1883).

Pomatostomus rubeculus, Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,088 (1886); North, Nests and Eggs Austr. Bds., p. 155 (1889); North and Keartl., Rep. Horn Sci. Exp. Centr. Austr., part II., *Zool.*, p. 91 (1896).

One adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to specimens from Northern and Central Australia.

[These remarkable birds were frequently noted between Mullawa and Lake Augusta. Owing to their sociable habits they have acquired the name of "Family birds," as they are generally found in flocks of six or seven. They seem equally at home on tree or ground, but are seen to the best advantage when disturbed. They then fly off one after another, alighting near the base of the nearest tree, which they ascend by a series of hops or jumps, keeping up an incessant chatter or mewing like a cat. During their antics their bills are generally elevated, and their tails erect or spread like a fan. Their huge stick nests, containing fresh eggs, were found on the Cue-road in June. At Fitzroy River they were found breeding in February.]

No. 38. Stigmatops ocularis (Brown Honey-eater).

Glyciphila (*?*) *ocularis*, Gould, Proc. Zool. Soc. (1837), p. 154.

Glyciphila ocularis, Gould, Bds. Austr., fol., vol. IV., pl 31 (1848); Gadow, Cat. Bds. Brit. Mus., vol IX., p. 213 (1884); North and Keartl., Rep. Horn Sci. Exp. Centr. Austr., part II., *Zool.*, p. 93 (1896).

Stigmatops ocularis, North, Nests and Eggs Austr. Bds., p. 198 (1889).

Glyciphila (*?*) *subocularis*, Gould, Proc. Zool. Soc. (1837), p. 154.

Stigmatops subocularis, Sharpe, Rep. Voy. H.M.S. "Alert," p. 18 (1884); Ramsay, Proc. Linn. Soc. N.S.W., vol. I, 2nd series, p. 1,092 (1886); North, Rep. Horn Sci. Exp. Centr. Austr., part II., *Zool.*, p. 93 (1896).

One adult male and one young male obtained near Derby. The adult male has a bleached appearance, and the head is more greyish than examples from Eastern Australia. A specimen from the same locality obtained by Mr. E. J. Cairn in 1886 cannot be distinguished from birds procured near Sydney. The young male has the cheeks, upper wing-coverts, and edge of the wing distinctly washed with yellow, and is similar in colour and size to young examples from Port Essington, the Gulf District, and Burwood, near Sydney. This is Gould's *S. subocularis*, separated by him from the present species on account of its smaller size and the yellower tint which pervades the plumage. I would here point out, however, that a yellow wash to some of the feathers of several species of the *Meliphagiidæ* is a certain indication of youth, and that it is entirely lost when the birds have attained their full adult livery. This may be more particularly observed in *Philemon citreogularis*, *P. sordidus*, *Myzomela pectoralis*, and the present species. With the exception of the adult male in the Calvert Collection previously referred to I can find no difference in adults and young birds of *S. ocularis* from Nothern and North-Western Australia with others obtained in the Eastern and South-Western parts of the Continent. One specimen in the mounted collection of the Australian Museum, procured at Port Denison, has an abnormally long bill. The following are the wing measurements of both adults and young from different localities :—

	Wing.	Locality.
(A) Ad. male	2·72 ins.	Dobroyde, Sydney, N.S. Wales
(B) Ad. female	2·72 "	Ashfield, Sydney, N.S. Wales
(C) Ad. male	2·72 "	Port Denison, Queensland
(D) Ad. male	2·65 "	Georgetown, Gulf District, Qu'nd.
(E) Ad. male	2·8 "	Georgetown, Gulf District, Qu'nd.
(F) Ad. male	2·65 "	Port Essington, North Australia
(G) Ad. female	2·7 "	Port Essington, North Australia
(H) Ad. male	2·7 "	Derby, N.W. Australia
(I) Ad. male	2·7 "	Derby, N.W. Australia
(J) Ad. female	2·72 "	Perth, S.W. Australia
(K) Juv. male	2·45 "	Burwood, Sydney, N.S. Wales
(L) Juv. male	2·4 "	Derby, N.W. Australia
(M) Juv. female	2·4 "	Port Essington, North Australia
(N) Juv. male	2·4 "	Port Essington, North Australia

All the young birds are more or less tinged with yellow, especially on the cheeks, upper wing-coverts, and edge of the wing.

[On my arrival at Derby on May 1, I found several kinds of trees in full blossom, and consequently Honey-eaters were plentiful. One of the noisiest for its size was the bird under notice. It showed a decided preference for the blossom of the Ti-tree, but occasionally visited the Eucalyptus. They were seen singly or in pairs.]

No. 39. Ptilotis flavescens (Yellow-tinted Honey-eater).

Ptilotis flavescens, Gould, Proc. Zool. Soc. (1839), p. 142; *id.*, Bds. Austr., fol., vol. IV., pl. 41 (1848); Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 245 (1884); Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,092 (1886).

Five males, two female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The range of this species extends east to Normanton in the Gulf district. Young birds have the upper surface paler than the adults.

[During the hot days of December and January these birds came to the water-trough at the well near the Telegraph Station in such numbers as to completely line the trough whilst they were drinking and bathing. They seem to be similar in their habits to *P. penicillata*, spending their time in bathing, chasing each other, and seeking insects or blossom amongst the branches of the different trees. The sexes are alike in plumage, and can only be distinguished by dissection. They were just building their nests when we left in March.]

No. 40. Ptilotis sonora (Singing Honey-eater).

Ptilotis sonorus, Gould, Proc. Zool. Soc. (1840), p. 160; *id.* Bds. Austr., fol., vol. IV., pl. 33 (1848).

Ptilotis sonora, Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 234 (1884); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,092 (1886).

A young female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The young of this species may be distinguished from the adult by its paler under surface, and having only narrow shaft-streaks of pale brown on the breast. It is distributed over the greater part of Australia.

[In the scrub near Geraldton these birds were first seen busy amongst such bushes as were in blossom in June, and from that time until my arrival at Derby, they were seen almost daily. Occasionally they were the only birds to be found on the sandhills Several clutches of their eggs were taken from the Casuarina and Acacia-trees during August.]

No. 41. Ptilotis keartlandi (Keartland's Honey-eater).

Ptilotis keartlandi, North, Ibis (1895), p. 340; North and Keartl., Rep. Horn Sci. Exp. Centr. Austr. part II., *Zool.* p. 93, pl. 6., upp. fig. (1896).

Three adult males, one young male. Obtained in the forest timber, near the Fitzroy River, on the way into Derby. It is interesting to meet with a series of skins of this Honey-eater, which Mr. Keartland first discovered during the visit of the Horn Expedition to Central Australia in 1894. It is also remarkable that Mr. Cairn, or the late Mr. Bowyer-Bower, did not meet with this species during the time they made large collections in the vicinity of Derby in 1886. Two of the adult specimens have the basal portion of the lower mandible yellow ; wing, 3 inches, to 3·3. The young male is slightly duller in plumage than the adult, and the patch of yellow feathers below the ear-coverts is not so bright and well-defined ; wing, 2·8 inches.

[On October 5 several of these birds were found far in the desert, south of Separation Well, in a small patch of scattered mallee. They were afterwards found at Gilgelly Creek and Derby. Probably the fact that so many of the trees were just out in blossom during the time of our visit at the end of April may account for their presence in such numbers.]

No. 42. Stomiopera unicolor (Uniform-coloured Honey-eater).

Ptilotis unicolor, Gould, Proc. Zool. Soc., (1842), p. 136 ; *id.*, Bds. Austr., fol., vol. IV., pl. 46 (1848) ; Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 249 (1884) ; Sharpe, Rep. Voy. Alert., p, 20 (1884).

Stomiopera unicolor, Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,092 (1886).

Four adult males. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to specimens from Northern Australia.

[The loud notes of this bird were only heard amongst the mangroves near the Fitzroy River. They seem to delight in bathing, and when not so engaged may be seen actively searching for insects or honey amongst the dense undergrowth which skirts the river. The sexes are alike in plumage.]

No. 43. Philemon sordidus (Northern Friar Bird).

Tropidorhynchus sordidus, Gould, Bds. Austr., fol., vol. I., introd., p. 58 (1848).

Philemon sordidus, Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 277 (1884) ; Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,092 (1886) ; North, Nests and Eggs Austr. Bds., p. 219, pl. 12, fig. 3 (1889).

Philemon sp. (?) Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 169 (1887).

Philemon juv (*sp. ?*), Ramsay, op. cit., vol. II., 2nd series, p. 169 (1887).

Philemon occidentalis, Ramsay, top. cit., p. 676 (1887), *imm.* male.

Four adult females, one immature male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Gould separated this species from *P. citreogularis* on account of its smaller admeasurements and larger bill. Five specimens from Port Essington, where the type of *P. sordidus* was obtained by Gilbert, have the bills of the same size as examples of *P. citreogularis*, procured in New South Wales. They are, however, much smaller, the wing measurements varying in length from 4·55 inches to 4·7. The present examples all have the bills larger than in *P. citreogularis*, and the wing measurement nearly alike, varying only from 4·95 inches to 5·05. They are slightly paler-brown above, and whiter on the under-surface, and have that washed-out appearance often seen in birds procured in very hot districts. The specimens obtained by Mr. E. J. Cairn on the Lennard River are slightly larger, and the wing measurement varying from 5·25 inches to 5·45. In the list of references given above it will be seen that I have included Dr. Ramsay's *P. occidentalis* as a synonym of this species. The type of *P. occidentalis* was obtained by the late Mr. T. H. Bowyer-Bower near Derby, and it is in precisely the same stage of plumage as the immature male of *P. sordidus* procured by Mr. Keartland, and from which it cannot be distinguished. Both specimens have all the feathers of the interscapular region edged with ashy-white, the outer webs of the inner primaries margined with greenish-yellow, a conspicuous patch of citron-yellow feathers on the sides of the lower neck, and only a faint tinge of yellow on the silvery-white throat. Immature specimens of *P. citreogularis*, from Eastern and Southern Australia, differ in having a bright citron-yellow throat, and only a few feathers on the sides of the lower throat tipped with citron-yellow.

Adult specimens of *P. sordidus* from North-Western Australia can only be distinguished from *P. citreogularis* by their bleached appearance and larger bill. The latter character is subject to much variation, especially in specimens obtained in different localities. In other respects the two birds are similar.

A nest of this species from which the female was procured was built in the drooping leafy twigs of a Eucalyptus growing near the Fitzroy River. It is cup-shaped in form, and is outwardly constructed of dried grass-stems and long strips of very fine bark-fibre, held together with the indumentum of some composite plant, the inside being lined entirely with dried grasses. Exterior measurements, $3\frac{3}{4}$ inches in diameter, by $5\frac{1}{2}$ inches in depth; interval diameter, $2\frac{1}{4}$ inches, by $3\frac{1}{2}$ inches in depth. An egg belonging to this nest is of a very pale-purplish-red ground colour,

with a few rounded spots and dots of dark-purplish-red on the larger end ; while appearing as if beneath the surface of the shell are underlying spots of faint purplish-grey-grey. Length, 1·03 x 0·73 inch. Another specimen has dull-purplish-red blotches uniformly distributed over the surface of shell, except on one side, and the ground-colour almost obscured with numerous streaky markings of faint purplish-grey. Length, 1·12 x 0·77 inch.

[In the neighbourhood of the Fitzroy River, and especially at Derby, these birds were very numerous. They seemed to require water as frequently as Finches and Pigeons, and dearly love a bath. Often whilst watching the different birds arriving and departing from the water-troughs I was annoyed by the visit of one or more of these birds, whose sudden arrival caused the immediate dispersal of all other species from the water. It is very pugnacious, and chases any intruders from the vicinity of its nest. Should an Owl be disturbed during the day he is immediately noticed by the Friar bird, and chased and worried for a great distance during which time many other birds join in the hunt. Many of their nests were found near the river, but only two eggs obtained. The nests were made of coarse grass, cup-shaped, and placed in the drooping foliage of the Eucalypt. When seen from below they bore a strong resemblance to those of the Chestnut-eared Finch. One of the birds was distinguished by its darker plumage and yellow markings on the sides of the neck. Whether another species or simply a variation in plumage with age I was unable to determine. It was being constantly attacked by the Sordid Friar-birds, which were numerous in the locality where it was shot.]

No. 44. Melithreptus lætior (Yellow-backed Honey-eater).

Melithreptus lætior, Gould, Ann. and Mag. Nat. His., 4th series, vol. XVI., pl. 287 (1875) ; *id.*, Bds. New Guinea, fol., vol. III., pl. 40 (1875-88) ; Ramsay, Proc. Linn. Soc., N.S.W., vol. I., 2nd series, p. 1,093 (1886).

Three adult males, one immature male. Camp near the junction of the Fitzroy and Margaret Rivers. Four examples of this beautiful Honey-eater, with its conspicuous bright-yellow hind neck and rump. The immature male has the outer primaries, most of the inner secondaries, and the lateral tail-feathers pale-brown. Wing, 3·3 inches. This very distinct species is also found in the Gulf District, Northern Queensland. In vol. IX. of the Catalogue of Birds in the British Museum its name is erroneously placed as a synonym of *M. gularis*.

[The neighbourhood of the Fitzroy River from Derby to its junction with the Margaret River appears to be the stronghold

of this beatiful Honey-eater. During February they were found in small flocks amongst the Mimosa, Bauhinia, and Eucalyptus saplings. Those seen in May had paired and were nesting.]

No. 45. Myzomela pectoralis (Banded Honey-eater).

Myzomela pectoralis, Gould, Proc. Zool. Soc. (1840), p. 170; *id.*, Bds. Austr., fol., vol. IV., pl. 65 (1848); Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 138 (1884); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 169 (1887).

Three young males. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. The youngest bird has patches of pale buff among the black feathers on the crown of the head, and has the mantle strongly mottled with the same colour; the innermost secondaries are conspicuously edged with white, and the ear-coverts are yellow. The other specimens have the ear-coverts a paler yellow, a few rich buff feathers in the mantle, and one of them some pale buffy-white feathers on the forehead. Adult birds have the ear-coverts pure white like the sides of the neck and the upper parts of the head, mantle and back black.

There is an adult male of this species in the Australian Museum, obtained by Mr. George Masters at Port Denison. Previously it has not been recorded further south in Queensland than Rockingham Bay.

[The trough at the well in the vicinity of our camp at the telegraph station near the Fitzroy River was frequently visited by these birds, and I soon obtained specimens for my collection. They were also found in considerable numbers at Derby in May, where the blossom afforded them an ample supply of food. Though the adult males are decidedely black-and-white, several of those shot appeared to be immature, and had old brown feathers dispersed through the black. I have reason to believe that the young of both sexes are plain dark-brown above and pale-brown or dirty-white beneath What appeared to be adult females corresponded in plumage with the young ones. A deserted nest of this species bore a strong resemblance to that of *M. nigra*, but was lined with a few bits of horsehair.]

No. 46. Entomophila rufigularis (Red-throated Honey-eater).

Entomophila rufogularis, Gould, Proc. Zool. Soc. (1842), p. 137; *id.*, Bds. Austr., fol., vol. IV., pl. 52 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol I., 2nd series, p. 1,092 (1886).

Entomophila rufigularis, Gadow, Cat. Bds. Brit. Mus., vol. IX., p. 219 (1884); North, Nests and Eggs Austr. Bds., p. 213 (1889).

Three adult males, one adult female, one not quite full-plumaged male. Camp about five miles from the junction of the

Fitzroy and Margaret Rivers. The wings of adults measure from 2·8 to 3 inches.

A nest of this species taken near the Fitzroy River in February, 1897, is attached on one side to a thin leafy twig of a species of *Bauhinia*, probably *B. Hookeri*, Mr. Fred Turner, F.R.H.S., kindly informs me. It is a deep cup-shaped structure, one side of it being considerably higher than the other, and is outwardly formed of very fine bark fibre, a small quantity of grass, and the outer covering of some composite plant, firmly matted and held together, the inside being neatly lined with fine dried grasses. On one side it measures exteriorly 4¼ inches, on the other 2½ inches; inside diameter, 2 inches. The eggs are two or three in number for a sitting, and are extremely variable in size, shape, disposition, and colour of their markings. The most common type is elongate-oval in form, white, with small irregular-shaped spots and dots of rich-red or pinky-red evenly distributed over the entire surface of the shell, and closely resemble the eggs of *Gerygone albigularis*, or *Malurus cyaneus*. Two sets of three each measure as follows:—Length, (A) 0·74 x 0·5 inch, (B) 0·76 x 0·51, (C) 0·73 x 0·5, (D) 0·77 x 0·54, (E) 0·68 x 0·53, (F) 0·73 x 0·5. A set of two are nearly round, and measure (A) 0·63 x 0·53, (B) 0·67 x 0·55. Another type has a zone on the larger end formed of large confluent dull-red blotches, and resembles some varieties of the eggs of *Malurus lamberti* or *M. longicaudus*. A third has the pure-white ground colour sparingly dotted and spotted with purplish-black, and in some specimens a few large penumbral markings of purplish-red on the larger ends, and resemble the eggs of *Glyciphila modesta* or *Ephthianura albitrons*. A set of two measures, (A) 0·68 x 0·48 inch, (B) 0·67 x 0·47.

[Near the Fitzroy River these birds were numerous. They were very active, and when seeking for insects amongst the long grass, or in the foliage of the various trees, kept up an incessant chatter, chasing each other or attacking birds of other species which happened to intrude on any bush on which they were feeding. They evince a decided liking for the small black fig, and also to shelter themselves from the sun amongst its foliage. At nesting time, which is immediately after rain in January or February, they become very tame and fearless. On several occasions I stood under a Bauhinia-tree, and watched them building their nests within five feet of my face. The nest, which is deep, cup-shaped, is always suspended by one side of the rim to the end of some slender twig, seldom more than six feet high, but on one occasion a pair built fully twenty feet from the ground in a Eucalypt at our camp. The nests were all built so that they could swing with the wind, and were constructed principally of fine grass. The eggs show great variation in colour and mark-

ings. Four clutches, taken from nests built near our camp, which were frequently visited during building and laying, and about which there is not the least doubt, differ thus :—No. 1 Clutch—Heavily freckled with light-red on white ground, elongated oval in shape. No. 2 Clutch—Much smaller than the above, slightly spotted at the larger end with small black spots on white ground, short, swollen, oval in shape. No. 3 Clutch—Sparingly marked with large dark-brown spots on white ground, oval shape. No. 4 Clutch—Heavily marked with dark-red, especially at the larger end, where the ground colour is almost completely obscured. Three eggs form the usual complement, but occasionally birds were found sitting on two.]

No. 47. Climacteris melanura (Black-tailed Tree-Creeper).

Climacteris melanura, Gould, Proc. Zool. Soc. (1842), p. 138 ; *id.*, Bds. Austr., fol., vol. IV., pl. 97 (1848) ; Gadow, Cat. Bds. Brit. Mus., vol. VIII., p. 334 (1883) ; Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 169 (1887) ; North, Nests and Eggs Austr. Bds., p. 239 (1889).

Three adult males, two adult females, two immature males. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Gould's figures of this species in his " Birds of Australia " are those of the male only. The female has the throat white, and the feathers on the lower portion of it broadly edged with chestnut-red. Immature males are brownish-black above and below, with narrow white streaks to the feathers on the throat, and sub-terminal spots of white on the under-tail coverts ; the fawn band through the centre of the wing is also of a richer colour than in the adults.

[Near the junction of the Fitzroy and Margaret Rivers these birds were often seen or heard. Their notes and habits closely resemble those of the well-known Brown Tree-creeper. They are very shy and difficult to approach. The adult female is easily distinguished by a white patch on the throat. Why this bird should be named the Black-tailed Tree-creeper is difficult to understand, when the term sooty or Black Tree-creeper would be so much more appropriate.]

No. 48. Phaps histrionica (Harlequin Bronze-wing).

Columba (*Peristra*) *histrionica*, Gould, Proc. Zool. Soc. (1840), p. 114.

Peristera histrionica, Gould, Bds. Austr., fol., vol. V., pl. 66 (1848).

Phaps histrionica, Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887) ; North, Nests and Eggs Austr. Bds p. 274 (1889).

Histriophaps histrionica, Salvad., Cat. Bds. Brit. Mus, vol. XXI., p. 529 (1893).

One adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[These birds were invariably found in large flocks in the vicinity of the Fitzroy River, where they came to drink towards evening, but as we traversed the open grassy plains south of the St. George Range, great flocks arose from amongst the Flinders grass, on the seeds of which they had been feeding. They are extremely sociable in their habits, always feeding and drinking in company, and wherever one nest is found many others may be looked for in the same neighbourhood.]

No. 49. Lophophaps ferruginea (Rust-coloured Bronze-wing).

Lophophaps ferruginea, Gould, Handbk. Bds. Austr., vol. II. p. 137 (1865); *id.*, Bds. Austr., Suppl., pl. 68 (1869); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd. series, p. 171 (1887).

Lophophaps plumifera, Salvad. (*nec* Gould), Cat. Bds. Brit. Mus., vol. XXI, p. 533 (1893).

An adult male and female, obtained near Mount Arthur, slightly darker and richer in colour than specimens procured by the late Mr. T. H. Bowyer-Bower near Derby, in October, 1886. The sexes are alike in plumage, but individual variation exists in the depth of the white band on the throat; in some specimens it is crescentic in form, in others it extends in a V-shaped marking down the centre of the throat. Two eggs, taken by Mr. Harris from a slight grass-lined depression in the ground, sheltered by a spinifex tussock, are swollen ellipses in shape, and of a uniform pale-cream colour, the grain of the shell being very fine and its surface slightly glossy. Length, (A) 0·94 x 0·77 inch, (B) 0·9 x 0·77 inch. These are the only authenticated eggs of this species that, as far as I am aware, have yet been found.

Count Salvadori has described this Pigeon in the "Catalogue of the *Columbæ* in the British Museum," under the name of Gould's older species, *L. plumifera*. The latter in his "Handbook to the Birds of Australia" states that "*L. ferruginea* differs from *L. plumifera* . . in the absence of the *broad white pectoral band* so conspicuous in the latter." In the "Aves of the Horn Expedition" I pointed out the difference between Gould's and Count Salvadori's descriptions of *L. plumifera*, but, judging from the measurements only, I there concurred that the bird described by Count Salvadori was similar to the one from which Gould had taken his original description of *L. plumifera*. Since the publication of the Report of the Horn Expedition, however, the Australian Museum has been enriched by the addition of the well-known Dobroyde Collection, which contains a fine series of the

Plumed Bronze-wings, and I now feel confident that the specimens from which Count Salvadori took his description of *L. plumifera* are only slightly paler-coloured examples of Gould's *L. ferruginea*, and not his true *L. plumifera*. This is supported by the fact that the talented author in describing *L. ferruginea*, and of which he had Gould's type before him, states that it is "Similar to *L. plumifera*, but the general cinnamon colour of a deeper hue." Moreover, there is now a sufficient number of specimens of Plumed Bronze-wings in the Museum, I believe, to satisfactorily answer the question asked by Gould in his Supplement to the Birds of Australia: "Are there two or three species of these charming little crested Pigeons?"

The last to be described, *L. ferruginea*, is a good and distinct species, which may be easily distinguished from *L. plumifera* by the absence of the white band on the chest, and its uniform cinnamon-coloured breast and abdomen. The habitat of this species appears to be restricted to that portion of West Australia lying between Champion Bay and King Sound. The late Mr. T. H. Bowyer-Bower obtained samples of it near Derby, North-West Australia, and it is from some of his specimens Count Salvadori has taken his description of *L. plumifera*. Gould's figure of *L. ferruginea*, although slightly high-coloured, otherwise accurately represents the distinguishing characters of this species. His original description of *L. plumifera* in the Proceedings of the Zoological Society is apparently taken from a young bird, for the middle of the abdomen is there described as being light-buff. In describing the same species in his Handbook, he states the abdomen is snow-white, which clearly applies to the bird he distinguished later on in his Supplement to the Birds of Australia, under the name of *G. leucogaster*. It was with hesitation that Gould separated the birds from South Australia under the latter name, and one of his principal reasons for so doing was that they were obtained in a locality far removed from the then known habitat of *L. plumifera*. In his Handbook, Gould remarks: "From Gilbert's journal I extract the following passage:—'Lat., 17° 30′. March 6. I was fortunate enough to kill for the first time *Lophophaps plumifera*.' I only saw the specimen I killed." In the "Old Collection" of the Australian Museum is a specimen of *L. plumifera*, which Dr. Ramsay informs me was presented to Mr. John Murphy, one of the members of Dr. Leichhardt's Overland Expedition, and who obtained it during the journey from Moreton Bay to Port Essington. Mr. Murphy, then a lad of 16, was with Gilbert at the time he treacherously met his death at the hands of the natives, and presumedly this is the historic specimen referred to by Gilbert in his journal, for there is no record in Dr. Leichhardt's work of any others being obtained,

except two shot by Brown the day before Gilbert secured his specimen, "but they were too much mutilated to make good specimens." Upon comparing a number of these Pigeons with white pectoral bands, and buffy-white or snow-white abdomens, from different parts of the Gulf District with others procured in Central and North-West Australia, I cannot but regard them as all being referable to one species—*L. plumifera*, of which I rank *G. leucogaster* as a synonymn. A pair of *L. plumifera* from the Gulf District have thrived well in the aviary at the Botanic Gardens, Sydney, for the past four years.

[The North-West part of Australia appears to be the home of this species. In habits and appearance at a distance they closely resemble *L. leucogaster* of Central Australia. In some rocky country near Gorda Town we saw these Pigeons for the first time. Several single birds were disturbed as we passed the base of the hills, but soon afterwards large coveys, consisting of about one hundred birds, passed from their feeding ground to the hills. At the homestead of Liverynga Station, I am informed, they are very abundant in the hills close by, and are so tame that as many as a dozen birds may be seen under the verandah seeking shelter from the hot sun, or drinking from a dish of water placed for their convenience They are also plentiful near the Margaret and Gascoigne Rivers. They deposit their two creamy-white eggs on the ground beneath the shade of a spinifex tussock in a slight depression in the ground, in which a few bits of grass are collected. I am indebted to Mr. Harris, of Fitzroy River, for the clutch in the collection.]

No. 50. Ocyphaps lophotes (Crested Bronze-wing).

Columba lophotes, Temm., Pl. Col., 142 (1823).

Ocyphaps lophotes, Gould, Bds. Austr., fol., V., pl. 70 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 44 (1849); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887); North, Nests and Eggs Austr. Bds., p. 277, pl. 4, fig. 10 (1889); Salvad., Cat. Bds. Brit. Mus., vol. XXI., p. 535 (1893); North and Keartl., Rep. Horn Sci. Exp. Centr. Austr., part II., *Zool.*, p. 99 (1896).

One adult female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers.

[These lovely birds had a peculiar interest for our party, as by observing the direction taken by them in the morning Mr. L. A. Wells found water on two occasions. They were present in the greatest numbers near Mount Bates, where they came in immense flocks to drink at a small pool. But wherever water existed throughout the journey they were seen. Being very plump and fleshy, they were often shot for the pot. At the Fitzroy River

several nests containing eggs or young birds were found during our stay.]

No. 51. Geopelia humeralis (Barred-shouldered Dove).

Columba humeralis, Temm., Trans. Linn. Soc., vol. XIII., p. 128 (1821).

Geopelia humeralis, Gould, Bds. Austr., fol., vol. V., pl. 72 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887); Salvad., Cat. Bds. Brit. Mus., vol. XXI., p. 455 (1893).

Erythrauchena humeralis, North, Nests and Eggs Austr. Bds., p. 277 (1889).

An adult male and female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Similar to examples from Eastern Australia.

[Among the dense timber along the banks of the Fitzroy River these birds were very numerous, but they were never seen far from water. They were always found in pairs, and several of their nests containing young were found on the Bauhinia-trees near the river.]

No. 52. Geopelia cuneata (Little Turtle-dove).

Columba cuneata, Lath., Ind. Orn. Suppl., p. 61 (1801).

Geopelia cuneata, Gould, Bds. Austr., fol., vol. V., pl. 74 (1848); Sturt, Exped. Centr. Austr., vol. II., App., 44 (1849); Salvad., Cat. Bds. Brit. Mus., vol. XXI., p. 462 (1893); North and Keartl., Rep. Horn Sci. Exp. Centr. Austr., part II., *Zool.*, p. 101 (1896).

Stictopelia cuneata, Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,095 (1886); North, Nests and Eggs Austr. Bds., p. 279 (1889).

One adult male. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. Two eggs taken from a frail nest of twigs are true ellipses in form, pure white, and measure (A) 0·79 x 0·6 inch, (B) 0·78 x 0·6 inch.

[Near Cue a few of these Doves were seen; but, afterwards, in the timbered country beyond Lake Way, they were disturbed in hundreds as the caravan passed along. They were found wherever water existed, and appeared to drink frequently. At the Fitzroy River several nests were found containing eggs or young. The nest, a very frail structure, is usually placed on the horizontal branch of a Bauhinia-tree, and consists of a few small twigs or grass-stems, so loosely thrown together that the eggs may be seen from beneath, and so flat on top that it is a difficult matter to bend the limb without causing the eggs to fall.]

No. 53. Turnix velox (Swift-flying Turnix).

Hemipodius velox, Gould, Proc. Zool. Soc. (1840), p. 150; *id.*, Bds. Austr., fol, vol. V., pl. 87 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887).

Turnix velox, North, Nests and Eggs Austr. Bds., p. 286 (1889); Grant, Cat. Bds. Brit. Mus., vol. XXII., p. 553 (1893).

An adult male and female. Camp about five miles from the junction of the Fitzroy and Margaret Rivers. *T. leucogaster*, described by me in the report of the Horn Expedition from a single specimen, may prove to be only a very bleached young bird of this species.

A set of three eggs of *T. velox* are of a pale-brownish-white ground colour, which is almost obscured by numerous minute reddish-brown and violet-grey freckles uniformly distributed over the surface of the shell. In one specimen the ground colour is almost a clear white, rendering the markings very distinct. Length, (A) 0·91 x 0·74 inch, (B) 0·91 x 0·7 inch, (C) 0·88 x 0·71 inch. Another set of two are slightly more pointed at the smaller ends, and have the pale-brownish-white ground colour thickly covered with very small indistinct markings of a slightly-darker hue. These specimens have a washed-out appearance, and look as if they had been exposed to the sun's hot rays for a long time. Length, (A) 0·92 x 0·72 inch, (B) 0·92 x 0·7 inch.

No. 54. Erythrogonys cinctus (Red-kneed Dotterel).

Erythrogonys cinctus, Gould, Proc. Zool. Soc., 1837, p. 155; *id.*, Bds. Austr, fol., vol. VI., pl. 21 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887); North, Nests and Eggs Austr. Bds., p. 307, pl. 16, fig. 5 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XXIV., p. 125 (1896).

Two adult males and two females. Swamp at the rear of the telegraph office, about five miles from the junction of the Fitzroy and Margaret Rivers. The crown of the head of adult females is bronzy-brown, like the back, but it becomes darker as the birds get older, and very old females can hardly be distinguished from the male. This species is represented in the Australian Museum by numerous examples from all parts of the Continent, except Queensland.

[These handsome little waders made their appearance at the swamps near the Fitzroy River immediately after the rainfall. They were found in small flocks, and frequently in company with the Marsh Sandpiper.]

No. 55. Tringa acuminata (Marsh Tringa).

Totanus acuminatus, Horsf., Trans. Linn. Soc., vol. XIII., p. 192 (1821).

Schœniclus australis, Gould, Bds. Austr., fol., vol. VI., pl. 30 (1848); Sturt, Exped. Centr. Austr., vol. II., App., p. 50 (1849).

Limnocincla acuminata, Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 171 (1887).

Heteropygia acuminata, Sharpe, Cat. Bds. Brit. Mus., vol. XXIV., p. 566 (1896).

An adult male and female in winter plumage, obtained at a small swamp immediately at the rear of the telegraph office, near the junction of the Fitzroy and Margaret Rivers. Examples are more frequently procured in Eastern Australia during October, November, and December.

[The first pair of these birds was obtained near camp on Creek. The two birds were obtained on different days in August, and were the only ones seen until after the tropical rains fell in January and February at the Fitzroy River, when they were seen wading in the shallow margins of the swamps. They display a peculiar habit of jerking up their tails whilst feeding or when about to fly. On disturbing small flocks of the Red-Kneed Dotterel (*Erythrogonys cinctus*), a bird of this species was after observed to rise in company with them, as though one of the flock.]

No. 56. Glareola orientalis (Eastern Pratincole).

Glareola orientalis, Leach, Trans. Linn. Soc. vol. XIII., p. 132, pl. XIII (1820); Gould, Bds. Austr., fol., vol. VI., pl. 23. (1848); Sharpe, Cat. Bds. Brit. Mus., vol. XXIV., p. 58 (1896).

Four adult females, one adult male, two young males. Shot near the camp about five miles from the junction of the Fitzroy and Margaret rivers. Recorded for the first time from North-West Australia. It is worthy of note that the late Mr. T. H. Bowyer-Bower obtained specimens of *G. isabella* (*G. grallaria Temm.*) in the same district. On the eastern coast *G. orientalis*, has been procured as far south as Botany, near Sydney.

[The appearance of this bird is regarded by residents of North-West Australia as an indication of the approach of rain, and it is locally known as the "Little Storm-bird." During January I noticed a flight of strange birds, which afterwards proved to be this Pratincole, about a-quarter of a mile from the telegraph station. I ran for my gun, but was surprised to see the birds rising from the ground like a continuous column of smoke and circling overhead until they spread out so as to almost obscure the sky. I was within one hundred yards of them when the last bird left the ground. After soaring and rising in the air they disappeared in a southerly direction. For about a month afterwards they were seen in large flocks nearly every day coming

from the West, and later in the evening returning in that direction. They came in a similar manner to a flight of Swifts, scattered over a wide area and circling or dashing along in pursuit of insects. Those shot had their gullets filled with beetles and grasshoppers. Owing to their tender skin I found it difficult to obtain specimens. Although a number was shot those which fell any distance were ruined by striking the ground, as the concussion invariably knocked off large pieces of skin. The examples secured were shot whilst skimming over a swamp, from which they were retrieved by a little black urchin about eight years old. The natives were very indignant at my shooting these birds, and a deputation from the blacks' camp explained for my edification that if I killed any more a big rain would come and never stop until it had washed everything away. Although I was responsible for the death of about a score of birds the deluge had not occurred in the district at the time of writing. Perhaps because I left.]

No. 57. Numenius minutus (Little Whimbrel).

Numenius minutus, Gould, Proc. Zool. Soc. (1840), p. 176; *id.* Bds. Austr., fol., vol. VI., pl. 44 (1848).

Mesoscolopax minutus, Sharpe, Cat. Bds. Brit. Mus., vol. XXIV., p. 371 (1896).

An adult male, shot in an open plain twenty miles south of Derby. This species breeds in Eastern Siberia and Mongolia, and winters in Australia. During its stay here examples may be obtained in the same month in districts exhibiting the extremes of temperature. Specimens have been procured during March in the Snowy Mountains, New South Wales, at an altitude of 3,700 feet, also on the hot plains of the Northern Territory of South Australia.

[On the open plains, near Derby, these birds were often noticed. Their mode of flight against the wind closely resembles that of the domestic Pigeon. In alighting on the ground they immediately become very active in their search for food, which consists of insects, especially grasshoppers, and a few small seeds.]

No. 58. Tribonyx ventralis (Black-tailed Rail).

Gallinula ventralis, Gould, Proc. Zool. Soc. (1836), p. 85.

Tribonyx ventralis, Gould, Bds. Austr., fol., vol. VI., pl. 72 (1848); Sturt, Exped. Centr. Austr., vol. II., App. p. 53 (1849); Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 172 (1887); North, Nests and Eggs Austr. Bds., p. 424, pl. 17, fig. 4 (1889).

Microtribonyx ventralis, Sharpe, Cat. Bds. Brit. Mus., vol. XXIII., p. 165 (1894).

Two adult females. Shot on a small swamp at the rear of the telegraph office, and about five miles from the junction of the Fitzroy and Margaret Rivers. Wing measurement, 8·1, 8·2 inches. Similar to examples from Eastern and Southern Australia.

[As soon as a good rainfall takes place in any part of West Australia this *Tribonyx* makes its appearance. A short time prior to our arrival at Lake Way in July abundance of rain had fallen and formed a fresh-water lake about five miles in circumference, around the margin of which thousands of these birds were seen. They appear just like a number of Bantam fowls running in the scrub and long grass, where they seek their food, often at a considerable distance from water. When disturbed they run rapidly for a short distance and then take wing, but always fly towards or over the water. The footprints of these birds were seen on nearly every dry claypan passed. As soon as the tropical rains formed swamps at the Fitzroy River these birds arrived, and hundreds were to be seen in places where a few days before no trace of them existed.]

No. 59. TADORNA RADJAH (Radjah Sheldrake).

Anas Radjah, Garnot, Voy. Coq. Zool., tom. I., p. 302 (1828).
Tadorna radjah, Gould, Bds. Austr., fol., vol. VII., pl. 8 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,096 (1886); North, Nests and Eggs Austr. Bds., p. 338 (1889); Salvad., Cat. Bds. Brit. Mus., vol. XXVII., p. 175 (1895).

One female. Shot on the Fitzroy River, about seven miles from camp. Some of the feathers in the centre of the chestnut pectoral band are missing, in other respects the bird is in perfect plumage. Wing 11 inches.

[These birds are very local in their habits, and at various places they frequent on the Fitzroy and Margaret Rivers they appear to spend most of the year. If shot and disturbed, they will return to the same spot during the night. In January a pair of adults with eleven newly hatched young ones were seen in the Margaret River. The nest which these birds had occupied was in the hollow spout of a Eucalypt overhanging the water. Although generally found in pairs, flocks of from four to eight are not uncommon. On two occasions single birds were seen in company with a flock of "Black Ducks."]

The eggs of the following species were also obtained :—

No. 60. CACATUA ROSEICAPILLA (Rose-breasted Cockatoo).

Cacatua roseicapilla, Vieill., Nouv. Dict. d' Hist., tom., XVII p. 12 (1817); Ramsay, Proc. Linn. Soc. N.S.W., vol II., 2nd

series, p. 170 (1887); North, Nests and Eggs, Austr. Birds, p. 251 (1889); Salvad., Cat. Bds. Brit. Mus., vol. XX., p. 132 (1891).

Cacatua eos, Gould, Bds. Austr., fol., vol. V., pl. 4 (1848).

Three eggs taken from a hollow branch of a tree near the Fitzroy River. When fresh they are pure white; but these specimens are very much nest-stained, and were apparently incubated. Length (A) 1·52 x 1·2 inch; (B) 1·47 x 1·18 inch; (C) 1·47 x 1·12 inch. These eggs are larger than any I have seen from Eastern Australia.

No. 61. Sauloprocta picata (Pied Fantail).

Rhipidura picata, Gould, Bds. Austr., fol., vol. I., Introd. p. XXXIX. (1848).

Three eggs. They are oval in form, and of a cream-buff ground colour with a band of small dull chestnut-red surface-spots on the thicker end, intermingled with underlying markings of pale bluish-grey. Length, (A) 0·73 x 0·56 inch, (B) 0·75 x 0·56 inch, (C) 0·73 x 0·58 inch.

No. 62. Cincloramphus rufescens (Rufous-rumped Lark).

Anthus rufescens, Vig. and Horsf., Trans. Linn. Soc., vol. XV., p. 230 (1826).

Cincloramphus rufescens, Gould, Bds. Austr., fol., vol. III., pl. 76 (1848); North, Nests and Eggs Austr. Bds., p. 153 (1889); Sharpe, Cat. Bds. Brit Mus., vol. VII., p. 500 (1883).

Ptenædus rufescens, Ramsay, Proc. Linn. Soc. N.S.W., vol. II., 2nd series, p. 168 (1887).

Two eggs found on the ground. They are of a pale purplish-white ground colour, with freckles, spots, and a few blotches of purplish-red distributed over the entire surface of the shell, the markings being slightly larger and darker on the thicker end. Length, 0·87 x 0·64 inch, (B) 0·91 x 0·7 inch.

No. 63. Synœcus australis (Swamp Quail).

Perdix australis, Lath., Ind. Orn. Suppl., p. 4, XII (1801).

Synoicus australis, Gould, Bds. Austr., fol., vol. V., pl. 89 (1848); Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,099 (1886); North, Nests and Eggs of Austr. Bds., p. 289 (1889).

Synœcus autralis, Grant, Cat. Bds. Brit. Mus., vol. XXII., p. 247 (1893).

A set of four are swollen ovals in form, pointed slightly at the end, and are of a uniform dull yellowish-white, except where nest stained. Length, (A) 1·22 x 0·92 inch, (B) 1·13 x 0·93 inch, (C) 1·1 x 0·9 inch, (E) 1·19 x 0·93 inch. Another set has the

yellowish-white ground colour slightly tinged with dull green, and are very finely freckled all over with pin-point markings of yellowish-brown. Length, (A) 1·12 x 0·88 inch, (B) 1·12 x 0·89 inch, (C) 1·12 x 0·87 inch.

I cannot agree with Mr. Ogilvie Grant* in uniting *S. diemenensis*, with this species, the wing-measurement being fully one inch longer than in *S. australis*. Moreover the eggs of *S. diemenensis* are larger, the ground color is a deeper green, and the marking more conspicuous. A set of the latter taken at Boat Harbor, on the North-west coast of Tasmania measure as follows, length, (A) 1·33 x 0·99 inch, (B) 1·3 x 0·97 inch, (C) 1·33 x 1 inch, (D) 1·33 x 0·98 inch, (E) 1·32 x 0·98 inch, 1·31 x 0·96 inch. Eggs of *S. australis* taken in Tasmania are similar in colour and size to those of continental birds of this species.

No. 64. Lobivanellus miles (Masked Plover).

Tringa miles, Bodd. Tabl. Pl. Enl. p. 51 (1783).

Lobivanellus personatus, Gould, Bds. Austr., fol., vol., VI., pl. 10 (1848).

Lobivanellus miles, Ramsay, Proc. Linn. Soc. N.S.W., vol. I., 2nd series, p. 1,099 (1886); North, Nests and Eggs Austr. Bds., p. 301 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XXIV. p. 140 (1896).

Two eggs, taken on the 8th of March, 1897, from the margin of a swamp about five miles from the junction of the Fitzroy and Margaret Rivers. They are rounded ovals in form, and of a yellowish-stone ground colour, slightly tinted with olive, with freckles, spots, and larger irregular-shaped markings of olive-brown and blackish-brown distributed over the entire surface of the shell, together with a few superimposed spots of dull bluish-black. Length, (A) 0·68 x 0·3 inch, (B) 0·63 x 0·31 inch.

No. 65. Hypotænidia philippensis (Land Rail).

Rallus philippensis, Linn., Syst. Nat. tom. I., p. 263 (1766).

Rallus pectoralis, Gould, Bds. Austr., vol. VI., pl. 76 (1848).

Hypotænidia philippensis, North, Nests and Eggs of Austr. Bds., p. 328 (1889); Sharpe, Cat. Bds. Brit. Mus., vol. XXVIII., p. 39 (1894).

Three eggs, taken in February, 1897. They are a pale cream-buff ground colour, with rounded spots and a few blotches of chestnut-red and dark bluish-grey, the latter colour appearing as if beneath the surface of the shell. Length, (A) 1·32 x 1·03 inch, (B) 1·33 x 1·03 inch, (C) 1·37 x 1·03 inch.

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* Grant, Cat. Bds. Brit. Mus. vol. XXII, p. 247 (1893).

The following notes by Mr. G. A. Keartland refer to birds observed during the expedition, and were either amongst the skins abandoned in the desert, or were shot for food :—

No. 1. Circus gouldi (Gould Harrier).

This species was only noted in the vicinity of the large fresh-water swamps at Lake Way and near the Fitzoy River. Beyond recognising its presence, and the fact that lizards, snakes, and grasshoppers form its chief food no information was obtained.

No. 2. Astur cinereus (Grey-backed Goshawk).

A single example of this species was shot near the telegraph station on the Fitzroy River.

No. 3. Astur approximans (Australian Goshawk).

Wherever surface water was found these birds were met with. Whilst duck-shooting in August, I saw one attacking a *Tribonyx*. It made several swoops at its intended victim, and would, no doubt, soon have killed it. They are very courageous. I saw one make several attempts to seize a half-grown fowl, notwithstanding the fact that a dog kept barking at it, and our black boy drove it away twice. A cartridge ended the trouble. At Johanna Springs I shot a fine female, and was surprised to find it so far in the desert. Amongst those killed were a female in adult plumage, whilst her mate still retained his immature garb. I had observed these birds building their nest near a creek, and if time had permitted I should probably have obtained their eggs. All the settlers wage war against the Goshawks on account of their depredations amongst the poultry. At a spring in lat. 22·23, long. 124·0, one was seen devouring a Crested Bronzewing Pigeon (*Ocyphaps lophotes*), which it had, no doubt, seized whilst drinking.

No. 4. Accipiter cirrhocephalus (Collared Sparrow-hawk).

Along the Fiztroy and Margaret Rivers, and their branches, these bold little birds were met with. Near our camp in January I was surprised to see a small male bird attacking a pair of Rose-breasted Cockatoos. The Cockatoos had selected the hollow branch of a tree for their nest, and whilst they were trimming the entrance to their future domicile the hawk made frequent swoops at them, knocking out bunches of feathers and causing the Cockatoos, which were more than twice his weight, to cry out with pain. This battle was continued for some time, and was eventually terminated with a cartridge, as I hoped to have the chance of robbing the cockatoos' nest myself.

No. 5. Aquila audax (Wedge-tailed Eagle).

Although in other parts of Australia these Eagles are found of various shades of colour—from very light brown to nearly black, I never saw a light-coloured one throughout our journey. In crossing the desert they were frequently seen pursuing the little wallabies so common on the sandhills. They generally hunted in couples. Soaring overhead, until their keen eyes detected their victim, they descended with unerring aim upon it. Several of their nests were seen in the desert gums on the sandhills, not more than 20 feet from the ground.

No. 6. Haliaetus leucogaster (White-billed Sea Eagle).

Along the North-West Coast, and on the rivers, these noble birds were seen. They are not at all as particular in their diet as many suppose, but will devour wallabies, ducks, or lizards as readily as they do fish. Mr. T. Carter informed me that he had taken their eggs, near Point Cloates, from a nest in which the remains of several wallabies were found.

No. 7. Haliastur girrenera (Red-backed Fish Eagle).

Several of these birds were seen along the course of the Fitzroy and Margaret Rivers, but owing to their shyness I was unable to obtain specimens. They were invariably found perched on high trees overhanging the water.

No. 8. Haliastur sphenurus (Whistling Eagle).

Greatly to my surprise, these birds were very rare. At Quanbun Station, on the Fitzroy River, two of them kept up a constant attack on the Rosebreasted and other Cockatoos which came to drink at the swamp. Along the rivers a few more were seen.

No. 9. Milvus affinis (Allied Kite).

These tropical scavengers were not seen until the Fitzroy River was approached early in November, but on our arrival at the telegraph station at the Crossing they were very numerous. All along the road from Derby to the Margaret River they may be seen in hundreds. During the heat of the day they seek shelter from the sun amongst the branches of the various trees, but both morning and evening they are either on the wing soaring overhead or seeking food on the ground. Nothing in the shape of carrion seems to come amiss to them. They are very tame, and are useful in clearing away the offal when cattle are slaughtered. They seldom attack poultry, and consequently are not molested. Grasshoppers form the chief portion of their food. They build their loose stick nests in the Baobab-trees during March and April.

No. 10. Lophoictina isura (Square-tailed Kite).

A few of these Kites were noted in the early part of our trip. At one of our camps near Lake Augusta in July I found a nest containing one young bird fully fledged. It was situated in a Cork-bark-tree, about 15 feet from the ground. The old birds were very shy and difficult to approach.

No. 11. Gypoictinia melanosternon (Black-breasted Kite).

Many of these birds were observed on the flats near the Fitzroy River. As our caravan passed along, they kept rising from the ground, and only flew a short distance before they again settled. They were never seen to perch. Two old nests were found, but neither contained eggs.

No. 12. Falco hypoleucus (Grey Falcon).

Several of these beautiful Falcons were observed near Mount Campbell, and also at Mount Arthur, but successfully evaded capture.

No. 13. Falco subniger (Black Falcon).

Many splendid specimens of this Falcon were noted between the Fitzroy and Margaret Rivers. Two nests examined were just ready for eggs. In structure they closely resemble those of *Hieracidea berigora*, and were placed in the highest trees in the neighbourhood.

No. 14. Falco tunutatus (White-fronted Falcon).

This ubiquitous bird was found wherever water exists. As an instance of its daring, I may mention that whilst camped at depôt in August a flock of Cockatoo-Parrots perched on a dead tree close to the waterhole, but before I could pick up my gun, a White-fronted Falcon dashed at them, causing the flock to scatter in all directions. In an instant it seized one in its flight, and was making off, when I fired at him, knocking out feathers. The Falcon dropped its prey, but secured it again before it reached the ground. A second shot at long range caused him to again let the Parrot fall; but it was quite dead. The White-fronted Falcon is probably one of the most courageous of the *Falconidæ*, and is able to attack with success young ducks and teal, which it will carry off, though much heavier than itself. Its marvellous power of flight enables it to travel a great distance in search of prey.

No. 15. Hieracidea orientalis (Brown Hawk).

These birds were found in great numbers in the early and latter parts of our journey, but very few were seen in the desert. In August several nests containing young were found,

and our party were interested in watching the assiduity with which the old birds carried out their paternal duty. From before daybreak until long after dark at night their cries might be heard as they flew over our camp, carrying lizards, &c., to their clamoring broods. Near the Fitzroy River they were found building their nests in March.

No. 16. Hieracidea berigora (Western Brown Hawk).

In the early part of our trip these birds were frequently noted in the mulga scrubs and forest country. Owing to their size, I regret I was unable to collect a series of skins to illustrate the variation in their plumage. Their habits and courage closely resemble those of the foregoing species.

No. 17. Tinnunculus cenchroides (Nankeen Kestrel).

This Kestrel was found during the early portion of our journey. Its habits are well known, and show no variation in the different parts of the Continent. Unlike any of the foregoing members of the order, the Kestrel frequently makes its nest in the hollow spout of a dead tree. On 28th August I took four eggs from a tree near our camp, and was surprised to find the nest lined with pellets of camel dung. This is probably the first time this material has been used for nest-lining.

No. 18. Pandion leucocephalus (White-headed Osprey).

These birds are very numerous all along the North-West Coast and the course of the Margaret, Fitzroy, Gascoigne, Ashburton, and Oakover Rivers. They seldom venture far from water, and their nests are usually placed in trees on the margin of the streams mentioned.

No. 19. Ninox boobook (Boobook Owl).

One of the most familiar sounds to be heard during the night, wherever timber was large enough to afford sufficient shelter, was the note of the Boobook. These birds were heard, and seen, near Lake Way and they were also numerous throughout the course of the rivers and creeks. Early in August a pair flew from the hollow branch of a large tree on the margin of a creek where we were shooting ducks. As I thought they had their nest there, the late Mr. Jones obliged by chopping out the limb, with the result that we found the nest just ready for eggs. During the day the birds are freqently seen amongst the foliage of the trees.

No. 20. Cacatua leadbeateri (Leadbeater's Cockatoo.)

These birds were only found in the desert, where morning and evening they were noted in their journeys to and from water or feeding on the bushes and ground.. They were usually in pairs,

and when camped near the native wells we seldom missed seeing them. They were very shy, and flew around several times to see that all was safe before alighting.

No. 21. Cacatua roseicapella (Rose-breasted Cockatoo).

Near Lake Way these birds were first noted on July 13, but a few days later Mr. Jones discovered two of their nests, from which he dislodged the birds. Subsequently, in crossing the desert, a number of other nests were found, and on October 15 Mr. Wells took three fledged young ones from a hollow tree on a sandhill. During February and March several nests, containing either eggs or young, were found near the Fitzroy River. It will thus be seen that these birds have not only a wide range in the North-West, but that their breeding-time is equally extensive. The birds were found in great flocks at all waters, and were so tame that no difficulty was experienced in shooting a number for the pot, five or six frequently falling to one shot. When well stewed, they form a very palatable dish.

No. 22. Cacatua sanguinea (Blood-stained Cockatoo).

This species was first noted between Mullawa and Cue, but at Lake Way the first nice specimen was obtained. They were not seen again until we reached the lagoons near the Fitzroy River, where they were in countless numbers. At one spot about six acres of ground was perfectly white with them. They were always seen in the vicinity of water, and spend a great portion of their time on the ground. Unfortunately when I had the opportunity of preserving them they were all so dirty or in such ragged feathers that I did not procure a good skin. During November the natives secured an immense number of nestlings, which they regard as excellent food. August and September are their usual laying months. After the young ones have left the nest, they keep up their incessant cry for food for some months.

No. 23. Calopsittacus novæ hollandiæ (Cockatoo Parrot).

Wherever surface water exists in North-West Australia the Cockatoo Parrots are seen as they arrive in large flocks to drink both morning and evening. Their food consists of various grass seeds, which they seek in the coolest parts of the day, but when the sun becomes hot they shelter under the densest foliage they can find, and at such times they will remain so still that the natives can approach to within a few yards and knock the birds down with their throwing sticks. Nestlings were plentiful at the Fitzroy River during January.

No. 24. Trichoglossus rubritorquis (Red-collared Parrakeet).

On approaching Derby several pairs of these birds crossed our line of march, but I was unable to secure specimens. However, the

fact that they breed in that neighbourhood was established by Dr. House, Government Resident, who showed me a beautiful pair of young birds in captivity which had been taken from a nest in the vicinity by a native. They were very tame, and appeared to stand confinement well in the large aviary in which they were kept. Dr. House also showed me several skins he had preserved from birds shot in his paddock.

No. 25. Platycercus zonarius (Port Lincoln Parrakeet).

From the commencement of our journey these birds continue to be fairly abundant until reaching Separation Well, after which they were not observed. Near the waterholes they might be seen in pairs or small flocks feeding on the ground or devouring the green shoots of several small plants. With the exception of a solitary pair of the Yellow-collared Parakeet, this was the only representative of the genus found in West Australia during the trip.

No. 26. Platycercus semitorquatus (Yellow-collared Parrakeet).

Although these birds are numerous in places between Albany and Fremantle, they seem to avoid the tropics. A single pair was found south of Lake Augusta in the end of July, but, judging from their poor condition, I concluded that they were out of their latitude. Mr. Wells shot them at a waterhole, and although the morning was well advanced, their stomachs contained very little food.

No. 27. Psephotus multicolor (Varied Grass Parrakeet).

These birds were frequently seen between Cue and Lake Augusta, but were not found further north. They were always seen singly or in pairs. They are of an affectionate disposition, and when one bird was shot and left where it fell for a few minutes, its mate invariably returned and perched near for a short time, and then approached the dead one to try and coax it away. They were generally found near water, and prefer mulga or mallee country.

No. 28. Melopsittacus undulatus (Warbling Grass Parrakeet).

Throughout the whole of the country traversed these birds were noted. They were breeding in July and August, and numbers of eggs and young birds were seen. On July 26 Mr. Jones took young birds fully fledged from a hollow limb, in which he found four nests. Two of the latter contained fresh eggs. Other nestlings were seen on August 26. As these birds require to drink frequently, their presence was always noted, and their course watched. They travel immense distances to feed, and in

the vicinity of Johanna Springs flocks of several thousands were seen going to some favorite feeding-place soon after sunrise. On three occasions I saw a beautiful yellow bird flying in the flock. These abormal birds were as richly coloured as a Norwich canary.

No. 29. Geopsittacus occidentalis (Western Ground Parrakeet).

Although the feathers of these birds were often found in the nests of various small birds or amongst the spinifex, where they had no doubt fallen victims to the hungry dingoes, I only saw one bird, which was disturbed by Mr. Wells' camel in passing through some spinifex on a stony rise on which scattered mulga trees were rather too numerous. Mr. Chas. F. Wells pointed out the spot where it had settled; but after a short search, it was flushed some distance away, showing that it had travelled fully fifty yards. Owing to the erratic flight of the bird through the scrub, I was unable to shoot it. I afterwards ascertained from the natives that these Parrakeets lay four eggs in a loosely-made cup nest under the shade of the spinifex. They are nocturnal in their habits, feeding and drinking at night, and hide during the day beneath the shelter of the tussocks, from which they only emerge when disturbed, and then they fly off like a quail, giving a short sharp note several times as they go.

No. 30. Cuculus pallidus (Pallid Cuckoo).

These well-known birds were found throughout the trip, and were seen from Mullawa in June to the Fitzroy River in March.

No. 31. Cacomantis flabelliformis (Fantailed Cockatoo).

Several of these birds were noted on the Fitzroy River, and in the vicinity of the telegraph office, during February.

No. 32. Lamprococcyx basalis (Narrow-billed Bronze Cuckoo).

These birds were frequently seen, and several shot during the early stage of our journey. At the Fitzroy River, Mr. Wells took an egg of this Cuckoo from the nest of *Malurus cruentatus*.

No. 33. Dacelo gigas (Great Brown Kingfisher).

Whilst camped at Mullawa, I heard the well-known notes of these birds, and found a few of them always near our quarters. They were also noted between Fremantle and Perth, but were not found north of Cue.

No. 34. Ægothetes novæ hollandiae (Owlet Nightjar).

Throughout the course of our journey I frequently saw these birds fly about our camp at night. As the caravan passed through the forests the unusual noise disturbed the Nightjars

from their retreats in the hollow branches of the dead trees. Whilst in pursuit of ducks with Mr. C. F. Wells on 8th August, he called my attention to one of these birds perched within a few feet of my head. It was nearly black, but whilst changing my cartridge it disappeared across the creek, and could not again be found. Subsequently others wers seen. They frequently came under the verandah at the telegraph station at night in pursuit of insects, flying in and out like Welcome Swallows.

No. 34. Hirundo neoxena (Welcome Swallow).

These well-known birds were only seen near Geraldton at the start of the expedition. They are by no means common in West Australia.

No. 36. Lagenoplastes ariel (Fairy Martin).

Near Cue and at Fitzroy River I saw numbers of these birds, and was informed that their well-known bottle-shaped mud nests are frequently seen among the rocks of the St. George Range.

No. 37. Cheramœca leucosternum (White-breasted Swallow).

Numbers of these pretty birds were seen tunnelling in the sandy crown of a hill near Cue on June 28, whilst others were examining crevices in the rocks. Mr. Jones, who was with me, kindly climbed to several places from which we saw the birds emerge, but found the nests were unfinished. These swallows were subsequently seen as we entered the desert, and on September 29 I obtained specimens of young birds just able to fly, in addition to adults of both sexes. A few were soaring overhead at Fitzroy River during January and the two following months.

No. 38. Artamus personatus (Masked Wood Swallow).

Early in August we passed through an immense flock of these birds in a mulga scrub. They appeared to be migrating, and to have simply stopped to satisfy the cravings of hunger, as they were soon busy amongst the grasshoppers. We camped for lunch, but, before resuming our journey, they had made a start. On several subsequent occasions they were noted, and near our camel depôt on August 25 they were found in company with *A. melanops* and *A. superciliosus*. As we approached the northern border of the desert we saw numerous flocks, whose welcome chirp was the only sound that disturbed the silence of the journey.

No. 39. Artamus superciliosus (White-eyebrowed Wood Swallow).

These birds were only seen on one or two occasions. Near the camel depôt on August 25 a number were noted, but, although I

visited the same locality frequently during the month I spent there, I only saw them once. On one or two mornings they were noted in the desert.

No. 40. Pardalotus ornatus (Striated Diamond-bird).

This bird was seen and shot near the Fitzroy River in January, but was in bad feather owing to heavy moult. It was observed amongst the top branches of a stunted gum-tree.

No. 41. Gymnorhina tibicen (Piping Crow Shrike).

Three of these birds were seen near Lake Way on July 12, and a few days later others were noted. Although I made diligent search and inquiries, I could find no trace of them so far north as the Fitzroy River.

No. 42. Gymnorhina leuconota (White-backed Crow Shrike).

Whilst in the train between Fremantle and Perth Mr. Jones drew my attention to these birds on several occasions as they perched on the trees near the railway line, or flew off on the approach of the train. No trace could be found of their presence further north.

No. 43. Cracticus robustus (Black-throated Crow Shrike).

The merry carols of these birds were frequently heard along the creeks before reaching Mount Bates, and specimens obtained. They appeared to watch for, and secure, their prey whilst the victim was drinking. One bird was shot whilst in the act of killing a Chestnut-eared Finch on the margin of a pool in creek. They were not seen further north.

No. 44. Pachycephala rufiventris (Rufous-breasted Thickhead).

These birds were numerous in the scrub along the course of the Fitzroy River, but were not noted elsewhere.

No. 45. Sphenostoma cristata (Crested Wedgebill).

This bird appears to have a very wide range in West Australia. Along the Cue road its notes were frequently heard, and birds were plentiful near Lake Way. At our camel depôt on Creek during August I obtained a number of specimens, and on several occasions killed the pair at one shot. In three cases, males in immature plumage, with horn-colored bills, were found mated to adult females; whilst at other times the sexes could not be distinguished without dissection. The Wedgebill delights in open country in which low bushes of dense foliage exist. Their nests are usually placed in the latter, about 3 feet or less from the ground, and are built of fine twigs, cup-

shaped, and lined with soft grass. Like *Oreoica cristata*, the Wedgebill is a most accomplished ventriloquist.

No. 46. Graucalus melanops (Black-faced Graucalus).

This bird was noted on many occasions throughout the trip, but appears to be most plentiful in the large timber near the creeks and rivers.

No. 47. Grallina picata (Pied Grallina).

As might be expected, these well-known birds were found near all surface waters passed. During January and February many of their nests were observed around the swamps near the Fitzroy River, and in March the natives brought several young ones to our camp. As the bird is so well known, skins were not preserved.

No. 48. Rhipidura albiscapa (White-shafted Fantail).

These birds, or what I thought to be them, were noted several times in the mangroves near the Fitzroy River, but as I was in pursuit of other birds, and did not care to shoot them, I cannot be certain as to their identity.

No. 49. Sauloprocta motacilloides (Black and White Fantail).

This well-known flycatcher was found throughout the journey. Near the camel depôt during the month of August Mr. C. F. Wells called my attention to a nest containing three eggs of this species. They were much more highly coloured than usual, being rich yellowish-brown with bluish-black markings. They were quite fresh. At the telepraph station at Fitzroy River a pair of these birds were constantly hopping about the kitchen door, and often went inside in pursuit of flies.

No. 50. Seisura inquieta (Restless Flycatcher).

The harsh grating notes of these birds were only heard near the Fitzroy River, where the birds were numerous. Instead of hopping along the ground like the Black Fantail, the Flycatcher was invariably noted in the tops of the tallest trees, where its restless habits rendered it conspicuous.

No. 51. Micrœca fascinans (Brown Flycatcher).

These birds were only noted near the Fitzroy River during March and the two following months.

No. 52. Petrœca goodenovii (Red-Capped Robin).

In the early part of our journey these birds were very numerous, being noted frequently from Cue to Separation Well, but further north the country appeared to be too dry and the climate

too hot. Although I was assured they occasionally frequent the Fitzroy River and its vicinity, I never saw them there.

No. 53. Melanodryas bicolor (Hooded Robin).

These birds were seen throughout the trip, being particularly numerous at Creek in August. On October 26 I found a nest of this Robin containing two eggs. It was placed on the horizontal branch of a desert gum-tree, about six feet from the ground. It was a cup-shaped structure, built of strips of bark, cobwebs, and fine grass. Although the rope holding our tarpaulin was tied to the branch, the birds visited and sat on the nest several times during the day. The eggs were dark-olive-green, with a reddish-brown tinge at the larger end. Other birds of this species were subsequently seen near the Fitzroy River.

No. 54. Malurus Lamberti (Lambert's Superb Warbler).

The first specimen of this species was obtained near Lake Augusta, but others were afterwards seen in considerable numbers, and frequently in company with *M. leucopterus* in the saltbush and samphire near Creek. At Separation Well several of their nests were seen in the low bushes near our camp, but the young birds had all taken wing prior to our arrival there on October 9.

Malurus leucopterus (White-winged Wren).

Several of these beautiful little warblers were seen near the camel depôt on Creek, and the late Mr. C. F. Wells shot some capital specimens, which were, unfortunately, abandoned in the desert. The male birds are very shy, except at breeding-time, when they become pugnacious, fighting and chasing each other away from the bushes where they purpose building their nests. On one occasion two males were so intent on their battle that I killed both at one shot from about 15 paces. The White-winged Wrens generally frequent the saltbush and samphire flats, but are also found in any low dense bushes and undergrowth. Three of their nests, containing fresh eggs, were found during September.

No. 55. Malurus leuconotus (White-backed Superb Warbler).

This shy little warbler was first noted in the saltbush near Lake Way, where several specimens of both sexes were obtained. They were afterwards noted at various places right across the desert, to within 50 miles north of Johanna Springs, but were not seen near the river. In the pursuit of these birds I found the homely-clad females very tame and easy to approach, whilst the males in full plumage were extremely shy. When heard or seen out of range the male would immediately either fly off or drop

into the thick undergrowth, and then hop away unobserved. As soon as he was at a safe distance, the females and young birds followed.

No. 56. Amytis striatus (Striated Desert Wren).

Although frequently seen as we travelled over the spinifex flats, I did not secure specimens of this bird until 6th October, about 40 miles south of Separation Well, where eight specimens (four of each sex) revealed the fact that there is no sexual difference in plumage. During August Messrs. L. A. Wells and Jones found several nests containing eggs belonging to this species, and subsequently a number of others were obtained. The nests were always placed on top of a spinifex tussock, and built of soft grass, with a large opening near the top. The eggs (two in number) were either finely or heavily spotted with light brown on a white ground.

No. 57. Amytis textilis (Quoy's Desert Wren).

Amongst the saltbush near Lake Way, and also on the samphire flats or scrub-covered sandhills near our camel depôt on Creek, I obtained over a dozen specimens of this bird, and in August secured a pair of young ones unable to fly. I found no variation in colour or structure in either sex or stage, adult or young. They all possessed the same stout bill and fleshy thighs. The sexes could not be distinguished without dissection. These birds keep close to the ground under some dense bush until disturbed, when they fly or run with great rapidity to the nearest shelter. Occasionally at mating-time they may be seen on a low bush, but seldom more than 2 feet from the ground. Wounded, it is almost impossible to secure them, as they run to shelter and hide like mice.

No. 58. Stipiturus malacurus (Emu Wren).

When approaching Separation Well we were surprised to find a species of small bird hiding in the spinifex. Numbers were seen, but, owing to their agility in concealing themselves, and their disinclination to fly, it was difficult work to secure them. The first one obtained was caught by Messrs. L. A. Wells and G. L. Jones by simply throwing a waterproof sheet over the tussock in which it secreted itself, and then removing the grass by degrees until the bird was caught. It proved to be an immature female. At the well I succeeded in obtaining three more (two males and one female). Thus in the arid desert and in hot weather we found birds that have hitherto been associated in our minds with moist localities. The males were extremely brilliant in colour, the throat being a very bright lavender-blue. These were all shot in a low acacia bush on a sandhill. Three of their

nests were found in the spinifex, but the young ones had all taken flight. These nests closely resembled those of the *maluri*, but had rather large side openings. It was extremely unfortunate that these skins were lost, as, although entered on my notes as Emu Wren, I am strongly of opinion that it is a separate species, as the tail feathers were very close in texture, and the throat of the male much more highly coloured than in any specimen of *Stipiturus malacurus* I had previously seen.

No. 59. Acanthiza apicalis (Western Acanthiza).

Amongst the samphire bushes near the camel depôt on Creek the musical note of this little *Acanthiza* was frequently heard, and numbers of their nests found. The latter is a pretty dome-shaped structure with a small opening at the side. It is built of soft grass and cobwebs, and decorated all over with white cocoons, which gave it a very pretty appearance. The eggs (three in number) are fleshy-white, freckled or blotched with red. All the nests discovered were within about 2 feet of the ground.

No. 60. Ephthianura tricolor (Crimson-fronted Ephthianura).

These gorgeous little birds were constantly met with throughout the trip, but were most numerous in the saltbush country. They appear to be quite indifferent to the proximity of water. They were first noted near Cue, were numerous near Lake Way, and odd birds were found in the driest parts of the desert. Sometimes they were in large flocks, but frequently single birds were seen.

No. 61. Ephthianura aurifrons (Orange-fronted Ephthianura).

Unlike the preceding species, these birds were always found at the fresh waters seen in the early stages of our journey. At Lake Way they were particularly numerous, clinging to twigs and rushes projecting above the surface of the water. They mingled with the Dotterel on the damp sandy flats, and were also found in the saltbush and samphire near camp. They were not seen again until after the tropical rains in February, when they appeared at the "bluebush" swamps near the junction of the Fitzroy and Margaret Rivers.

No. 62. Pyrrholœmus brunneus (Brown Red-throat).

Before reaching Cue this lovely little songster made his presence known. They seem to delight in saltbush and country thickly studded with low dense bushes, and although their sweet notes are frequently heard, the birds themselves retire to the thick foliage on the approach of man. When undisturbed, they may be seen hopping amongst the grass. Specimens were

secured on several occasions between Cue and Separation Well, but they were not found further north. During the flying trip taken by Messrs. L. A. Wells and G. L. Jones in August they found a beautiful clutch of three eggs of this species. The nest was in a thick bush about 3 feet from the ground.

No. 63. Calamanthus campestris (Field Calamanthus).

Although the Field Calamanthus is generally found amongst coarse grass, heath, and scrub, in moist localities, it seems to thrive equally well in the dry sandy parts of West Australia. They were frequently disturbed amongst the samphire, saltbush, and grass near the camel depôt, and morning and evening enlivened our camp with their songs, as perched on some elevated spot one would pour forth its daily carol. Several nests were found during August, two of them being discovered lying on small patches of bare ground, in such exposed positions as to convey the idea that they had been cast away by some passing oologist Mr. Chas. F. Wells found another beneath the shelter of a low saltbush. All the eggs taken were of the usual colour and character.

No. 64. Xerophila leucopsis (White-faced Xerophila).

In the mulga scrubs between Mullawa and Lake Way these birds were frequently seen, either singly or in small flocks. They are very active, either on the ground or amongst the scrub Their bulky nests are usually located amongst drooping foliage of the casuarina or acacia ; but on one occasion Mr. Jones pointed out a hollow log about 8 feet high into which he had noticed a small bird disappear, and on splitting it open we were surprised to find a Xerophila's nest, containing three fresh eggs, at the bottom of the spout. A few days afterwards another was found in a similar position. The Xerophila was not found further north than Lake Augusta.

No. 65. Cincloramphus cruralis (Brown Cincloramphus).

At the camel depôt on Creek these birds were first noted. Their well-known habit of singing loudly as they fly from tree to tree or rise from the ground, giving a final chirp on perching, was frequently noticed. The specimens shot appeared to be identical with those found in other parts of Australia. They were also seen at the Fitzroy River.

No. 66. Cincloramphus rufescens (Rufous-tinted Cincloramphus).

These birds were particularly plentiful amongst the long kangaroo grass along the creeks between Cue and Lake Augusta,

and also near the Fitzroy River. Their habits are too well known to require further comment.

No. 67. Pomatostomus superciliosus (White-eyebrowed Pomatostomus).

These birds were found in several places between Mullawa and Lake Augusta, and afterwards at Fitzroy River and along the Nerrima and Jilgelly Creeks, their noisy chatter and sprightly antics frequently causing much amusement. They were breeding near Cue in June and at Fitzroy River in February. On two occasions they were seen in company with *P. rubeculus*.

No. 68. Poephila mirabilis (Crimson-headed Finch).

Although I only obtained an immature live bird, caught at Derby, Mr. Wells brought evidence in the shape of a cageful of adults that they are plentiful in that locality. I was also informed that they are numerous at Wyndham, a fact which shows that they range across the northern portion of the continent from east to west.

No. 69. Tæneopygia castanotis (Chesnut-eared Finch).

These little birds had a peculiar share in our interest, as their presence in numbers is a pretty good indication of the proximity of water. Wherever rockholes or wells containing water were found immense flocks of these birds were seen. They seem to possess an insatiable thirst, and will alight in flocks to drink close to where men are working. When we were baling water for the camels they frequeutly perched on the sides of the dishes to drink. I am strongly of opinion that they possess the ability to scent water, as on several occasions during the hot days of April flocks perched on the trees under which we were enjoying the midday halt, and were not easily scared, but kept hopping on the water casks and near the pannikins containing hot tea. Although constantly chased by my dog, they simply evaded the attack, and as soon as allowed drank from a tin of water placed for them. At one rockhole passed soon after leaving Lake Way they were in such numbers as to pollute the water with their droppings. They were found from Mullawa to the Fitzroy River. In some cases three or four nests containing fresh eggs were found on one bush. They build in all sorts of places, nests being found in the tall desert gums, in holes in hollow logs, on low bushes, or on the ground under the low-spreading saltbush. They often start laying as soon as the foundation of the nest is placed in position, and kept on building and laying until both operations were finished. The material used is invariably dry grass stems. The birds seek the shelter of their nests at night, even after their broods are hatched. Notwithstanding that one

pair, which built their nest in our bough shade, were frequently handled by our Afghans at the camel depôt, they remained there, laid the full clutch of bluish-white eggs, and reared their brood. Mr. Wells found a Wedgebill's nest near our camp which had been appropriated by a pair of these Finches. It contained one egg when first discovered, but before the clutch was completed the birds had finished roofing it over.

No. 70. Cinclosoma castaneonotum (Chesnut-backed Thrush).

About 40 miles south of Separation Well several of these birds were shot. They were very shy, and when disturbed from one bush soon sought shelter under another. The specimens secured were moulting at the time (September).

No. 71. Cinclosoma cinnamomeum (Cinnamon-colored Thrush).

These birds delight in rough stony country, and were numerous around our camp at the camel depôt. They lie concealed under low bushes until approached within a few yards, when they fly off to other shelter. They were never seen to perch. Several of their nests were found on the ground under low bushes. In each case the bird had scraped a slight hollow, and lined it with a few acacia leaves. The nest was so loosely made that it fell to pieces on being lifted. The clutch consisted of two eggs of a dirty-white ground colour, heavily blotched with umber-brown and slatey-grey.

No. 72. Corvus coronoides (Hazel-eyed Crow).

During the early part of our journey these birds were frequently observed, but as the hot weather set in in October they became scarce, and were afterwards found only in the vicinity of water, so that, to us at least, they ceased to be birds of evil omen. In December and the first week of January they were very numerous around our camp, and united with the Kites *(Milvus affinis)* in performing the duty of scavengers. During the heat of the day they might be seen either perched or flying with their bills wide open, showing that they too suffered from the scorching sun. As the rain-time approached, and the Channelbill *(Scythrops)* made his appearance, we often witnessed twenty or thirty Crows indulging in an attack on the latter, until they had chased him for over a mile. Two birds generally approached the *Scythrops* simultaneously, as they appeared to have a wholesome dread of his formidable bill. As soon as the rain came the Crows all cleared off, and were not seen again before we left, on 16th March.

No. 73. Ptilotis penicillata (White-Plumed Honeyeater).

Between Lake Way and Lake Augusta these birds were plentiful wherever water existed, and several nests containing young ones were noted on 3rd July. Near our camel depôt on Creek three clutches of eggs were taken in the latter part of August. All the eggs were remarkable for the whiteness of the ground colour and the very dark spots with which they were marked. The fondness of the White-Plumed Honeyeaters for bathing may account for the fact that they were never seen far from water. They were not observed further north than Lake Augusta, but on the Fitzroy River give place to *P. flavescens.*

No. 74. Certhionyx leucomelas (Pied Honeyeater).

This rare honeyeater was first obtained in some scattered mallee some distance south of Separation Well, on 25th September. At that time they were in poor plumage. Several of the male birds shot had brown feathers scattered through the black, indicating, probably, that they were immature birds, and that the young of both sexes are of the same colour as the female, which closely resembles *Anthus australis* in colour and markings. Towards the end of October flocks ef these birds frequently passed us going north. On 22nd October I found a nest of this bird. It was built of short grass-stems, woven together with spider's web, and suspended by the rim in a cork-bark tree. Both birds were at the nest, and I shot the male, which proved to be a beautiful specimen. The solitary egg which the nest contained bore a strong resemblance to that of the Sordid Wood Swallow, the ground colour being a dirty-white, finely spotted, especially at the large end, with brownish-black and slate colour. Although these birds had all been very easily approached to within twenty yards, others seen near the Fitzroy River in January were very wary, and I was unable to secure them.

No. 75. Acanthogenys rufigularis (Spiny-cheeked Honeyeater).

From Mullawa to near Separation Well these birds were frequently met with, and in the mulga scrubs they were to be seen in numbers. They were never noted further north than Separation Well.

No. 76. Anthochæra carunculata (Wattled Honeyeater).

Whilst in camp at Mullawa a number of these honeyeaters were frequently seen and heard. A specimen shot presented no features of difference from those obtained in the southern portions of the continent. They were not seen afterwards.

They are said to be plentiful between Fremantle and Albany, and are locally known as "gill birds."

No. 77. Myzomela nigra (Black Honeyeater).

About 70 miles north of Mount Bates I noticed several of these little honeyeaters on the Grevillea trees, which were in full blossom, and on 2nd October Mr. C. F. Wells found a nest, from which the bird flew as he passed the bush. It was very small cup-shaped, built of the soft outer strippings of dead grass, bound together with cobwebs, and suspended by the rim in a ti-tree bush. It contained one pale-buff egg, somewhat darker at the larger end, sparingly spotted with brown. The birds were again seen at the junction of the Fitzroy and Margaret Rivers during December.

No. 78. Myzantha flavigula (Yellow-throated Miner).

Between Lake Way and Separation Well these birds were frequently noted, and several shot, and isolated pairs were occasionally found in the sandhills until nearing the river. Mr. Jones secured a clutch of three eggs during August a short distance north of Lake Augusta.

No. 79. Zosterops Gouldi (Green-backed Zosterops).

Near the Fitzroy River these birds were found in considerable numbers. They are similar in habits to their eastern and southern representative (*Zosterops cærulescens*), and at the time of my visit were confined to the dense scrub on the margin of the river.

No. 80. Dicœum hirundinaceum (Swallow Dieœum).

These beautiful little birds were found throughout the journey, and probably their presence may account for the great number of trees on which the various kinds of mistletoe were found. All the adult males seen were remarkable for the brilliancy of their plumage.

No. 81. Climacteris superciliosa (White-eyebrowed Tree Creeper).

Two of these birds were shot near Lake Augusta. They proved to be of opposite sexes. They were found in company, and on splitting the log open from which one of them flew, we found a nest nearly ready for eggs.

No. 82. Climacteris erythrops (Red-eyebrowed Tree Creeper).

Two of these birds were shot soon after leaving Cue. They were found in mulga scrub, ascending the stems of the trees in a series of short hops, and seeking the insects in crevices which

they passed. On reaching the top of the tree, they immediately flew off to the base of the next, where the operation was repeated.

No. 83. Sittella pileata (Black-capped Sittella).

Flocks of these birds were noted near Lake Augusta during the months of August and September, and also at the Fitzroy River in January. They seemed to confine their attention to the smaller trees in the scrub, whereas the Oraage-winged Sittella delights in running up and down the tallest box-trees.

No. 84. Phaps chalcoptera (Bronzewing Pigeon).

During our stay at the camel depôt on Creek I found these birds in considerable numbers in the open scrub. They came out to feed and drink morning and evening, but during the heat of the day sought the shade of some low bush. At such times they proved very wary; but when they came to water in the evening they often alighted on the ground within 10 feet of where I sat. At Johanna Springs they were especially numerous, as many as thirty being counted on a bare patch of ground at one time. As from three to four usually fell to a shot, they formed a welcome addition to our larder. Whenever this bird is observed at sunset, it is almost certain to be going to drink; but as their power of flight is wonderful, they travel a great distance in a short space of time. Although many hundreds of these birds were seen during the trip, I never noticed one perch on a tree. They were all either flying or on the ground.

No. 85. Geopelia tranquilla (Peaceful Dove).

These birds were only found near to the Fitzroy River and in the neighbourhood of Derby. They were generally seen singly or in pairs, their low plaintive note revealing their presence.

No. 86. Leipoa ocellata (Ocellated Leipoa).

The presence of this bird in the mulga scrubs between Cue and Separation Well was established by the finding of their mounds, feathers, and footprints; but as they are extremely shy, they retired on the approach of the caravan, and sought shelter in the scrub.

No. 87. Synoicus australis (Swamp Quail).

Amongst the tall kangaroo grass between Lake Way and the camel depôt numbers of these birds were seen, and several shot. One female killed on 20th August contained a perfect egg in the oviduct. Others were seen near Mount Arthur in April, and several clutches of their eggs were picked up as we crossed a

level plain covered with Flinders grass. The eggs were scattered, as though they had been washed from the nests by recent tropical rains. Both birds and eggs were identical with those found in Victoria.

No. 88. Turnix velox (Swift Flying Turnix).

These birds are found in North-West Australia throughout the year, frequenting alike the Flinders and Mitchell grass plains, the spinifex of the desert, and the tall kangaroo grass along the creek flats, but are most numerous near the junction of the Fitzroy and Margaret Rivers. At the latter place they get the credit of eating off the young plants in the gardens of the settlers as soon as they show above ground. Whether the charge is a just one I cannot say, but I was taken into the garden by Mr. Harris to see some young melon and cucumber plants that had just come up. On approaching the cucumber bed, three of these birds flew away, and we found that nearly all the plants had been eaten off. The bird may be driven to this practice by the scarcity of green food, which they take in conjunction with seeds and insects. After rain falls they become extremely numerous in the green grass which immediately springs up. As these birds are only occasional visitors to the southern portions of the continent, it is highly probable they are driven south by protracted drought. They seem to breed nearly all through the year, four eggs being the usual complement.

Turnix leucogaster (White-breasted Turnix).

Throughout the whole of the journey from Cue to Derby these birds were noted. Whether we traversed the dense kangaroo grass near the creeks, the scattered herbage in the timbered country, or the arid spinifex flats between the sandhills, they rose beside our track nearly every day. In some places they were so numerous that they were flushed every fifty yards. On one occasion, soon after daybreak, I counted no less than fifteen birds all in sight at one time feeding on a patch of very short spinifex. Their eggs or young were frequently found from early in July until March. They were often found at a great distance from water; on several occasions, however, I disturbed them whilst drinking.

No. 89. Dromaius irroratus (Spotted Emu).

These birds were very plentiful in the vicinity of Lake Way, and their tracks were frequently noticed wherever water or Quondong trees existed. The fruit of the latter appears to be a favourite food of the Emu, as from twenty to thirty nuts were frequently seen in the bird's droppings. Several nests, in which

the brood had recently been hatched, were passed, and the chicks themselves noted during July. The nests were usually found in the open spinifex flats between the sandhills. Although no adult specimens were secured, the birds were often seen, and feathers obtained in places where the Emu had fallen a victim to either the natives or dingoes.

No. 90. Chariotis australis (Australian Bustard).

During the early and latter parts of our journey these birds were seen in great numbers, but they avoid much of the desert. Near the Fitzroy River Mr. Ferris found a fresh egg on the 11th November, and several young birds were seen a few weeks later. On two occasions female birds with their single chicks were noticed walking to water, and on attempting to approach them we found the young ones suddenly disappear. In each case they had forced themselves into the hole formed by a horse's hoof in the dry mud. Near Mount Campbell I counted eighteen bustards all in view at once. Whilst travelling near the Nerrima Creek, on 1st April, I bagged a brace of bustards, which were in capital condition, and must have weighed nearly 20 lb. each. One bird furnished four meals for three men and a dog, whilst the five natives in camp made two meals off the other. These birds were in heavy moult; but the fact that the grasshoppers had been very plentiful no doubt accounted for their condition.

No. 91. Œdicnemus grallarius (Southern Stone Plover).

Several of these birds were seen on the stony ground near our camel depôt during the month of August. They were extremely shy, and difficult to approach. Although these birds are nocturnal in their habits, they commenced to run before I was within 150 yards of them, and defied all attempts to capture or shoot them. As we approached the Fitzroy River, before daybreak of 6th November, the weird notes of the Southern Stone Plover were amongst the delightful music that greeted our ears, as it is well known that although this bird spends the day in the forest or open plain, it always resorts to water at night.

No. 92. Lobivanellus miles (Masked Plover).

Near the Fitzroy River many of these birds were seen, but when the rains fell they scattered to the numerous swamps which were then formed. Their habits are precisely similar to those of *L. lobatus*. Unfortunately the birds all disappeared before I had the opportunity of preserving specimens. I am indebted to Mr. Jas. Livingstone for a pair of eggs of this bird, which he obtained near the river. They were taken from a slight hollow in the ground, and were of a dull olive-yellow, heavily blotched with brownish-black markings.

No. 93. Eudromias australis (Australian Dotterel).

At the first lagoon we passed on approaching the Fitzroy River a number of these birds were seen running near the margin of the water. When alarmed, they rose quickly, their long pointed wings enabling them to travel a great distance in a very short time. Although on several occasions three or four birds were disturbed near together, each went off by itself, either on to the open plain or some other part of the lagoon. On our return along the course of the river to Derby they were frequently disturbed some distance from water. They were never seen in flocks.

No. 94. Ægialitis melanops (Black-fronted Dotterel).

At all creeks or pools passed between Mullawa and the Fitzroy River this active little Dotterel was found, either singly or in pairs, running along the margin of the water in search of small aquatic insects. During August several young birds, just able to fly, were shot at the camel depôt, and one fresh egg was picked up beside a pool. On 7th November I found several pairs of newly-hatched young ones on the sandy bed of the Fitzroy River. Although probably not more than a day or two old, they ran very quickly for some distance before being caught. When one was captured it invariably proved that the other had escaped during the chase. When newly hatched, the Black-fronted Dotterel is probably the most handsome of all Australian birds at that age.

No. 95. Ægialitis ruficapillus (Red-capped Dotterel).

Large numbers of these birds were found at the fresh-water swamp near Lake Way. They congregated on the sandy margin in great flocks, and ran over the moist ground with surprising rapidity in search of food; but when their wants were satisfied they again assembled in groups, and remained in one position for over an hour, if undisturbed.

No. 96. Glareola isabella (Australian Pratincole).

Single examples of this species were frequently seen on the open plains within a few miles of Derby and at the swamps near the Fitzroy River. I was informed that they breed in considerable numbers on the stony rises near the Margaret River.

No. 97. Recurvirostra novæ-hollandiæ (Red-necked Avocet).

This well-known wader was frequently observed in the shallow swamps near the Fitzroy River. Running amongst the weeds in the shallow swamp, the Avocet dexterously secures a supply of minute aquatic insects by the aid of its peculiar awl-like bill. They were often seen in company with the White-headed Stilts.

No. 98. Himantopus leucocephalus (White-headed Stilt).

At the large fresh water lagoon near Lake Way these birds were found in great numbers. On 14th July a few were shot for the pot, and amongst those secured young birds predominated. After the rains fell in January large flocks of Stilts visited the pools along the Fitzroy River, where their peculiar croaking notes often betrayed their presence amongst the coarse grass tussocks growing in the water. When disturbed, their manner of extending their long legs behind whilst flying gave them a very grotesque appearance.

No. 99. Cladorhynchus pectoralis (Banded Stilt).

Several of these birds visited the swamps near the Fitzroy River during our stay in that locality. They were observed feeding in company with Avocets and White-headed Stilts.

No. 100. Gallinago australis (New Holland Snipe).

During February a number of Snipe were seen along the course of the creek running from the telegraph station to the Fitzroy River, and also on many of the marshes formed by the heavy rain. They were very wild, and frequently rose far out of range.

No. 101. Rhynchæa australis (Australian Rhynchæa).

On 14th August a fine bird of this species was shot by Said Aimeer as it was wading in the shallow water of the creek at the camel depôt. It proved to be a female, well developed, and would soon have laid. The peculiar formation of its trachea proved a matter of great interest to our Afghan, who was never tired of asking questions concerning it.

No. 102. Gronticus spinicollis (Straw-necked Ibis).

These birds were numerous along the course of the Fitzroy River, and they were found wading in many of the swamps on its margin. Occasionally large flocks were observed perched on the dead trees we passed. As an instance of the tenacity of life in the Ibis, I may mention that one shot by Mr. Wells flew nearly a quarter of a mile after a Winchester bullet had passed through its body in an oblique direction.

No. 103. Threskiornis strictipennis (White Ibis).

A few of these birds were seen at the lagoons near the Fitzroy River, but they were rare in comparison with the straw-necked species.

No. 104. Platibis flavipes (Yellow-legged Spoonbill).

Many of the lagoons on the southern side of the Fitzroy River are resorted to by the Spoonbill. They were also seen on the sandy flats of the river.

No. 105. Grus australianus (Native Companion).

These birds were generally met with in pairs until April, when they were seen in large flocks. They were found in the river bed and on the open plains, but seem to prefer the timbered country. Their loud notes often betrayed their presence some time before the birds themselves were seen.

No. 106. Xenorhynchus australis (Australian Jabiru).

These birds were observed on several occasions near the junction of the Fitzroy and Margaret Rivers, and one of their old nests on the latter stream was pointed out to me. It consisted of a large mass of sticks, and, viewed from beneath, somewhat resembled the nest of *Aquila audax*, though a trifle smaller. The natives occasionally secure the young birds.

No. 107. Ardea pacifica (Pacific Heron).

These birds were first noted soon after leaving Cue, and were afterwards found at all surface waters passed; but as soon as rain fell, they were seen in great numbers at the swamps near the Fitzroy River. Their strange habit of standing motionless in the swamps or on trees near the water, rendered their long white necks a marked feature in the locality. Their food consisted of water beetles, frogs, and small fresh-water snails.

No. 108. Ardea novæ-hollandiæ (White-fronted Heron)

This well-known Heron was frequently met with during the early part of our journey, but they were more numerous in the vicinity of the Fitzroy River. Although generally found singly, they were occasionally seen in flocks, varying from three to a dozen.

No. 109. Nycticorax caledonicus (Nankeen Heron).

In searching amongst the dense timber on the banks of the Fitzroy River, I disturbed many hundreds of these birds. Although nocturnal in their habits, they are very wary, and not easily surprised during the day. They breed in great numbers amongst the tall mangroves, and the young birds form an important item in the *menu* of the natives.

No. 110. Porphyrio bellus (Azure-breasted Porphyrio).

Several of these birds were found near the junction of the Fitzroy and Margaret Rivers, where they were seen wading in the shallow swamps, or perched on trees growing in the water. Their habits are identical with those of the well-known Black-backed Porphyrio.

No. 111. Hypotænidia phillippensis (Pectoral Rail).

A few of these birds were flushed near the camel depôt on Brockman Creek, and also near the junction of the Fitzroy and Margaret Rivers. At the latter place two clutches of hard-set eggs were taken during February.

No. 112. Fulica australis (Australian Coot).

Large flocks of these birds were seen at the lagoons passed on the south side of the Fitzroy River. When disturbed, they simply flew a short distance, and settled on the water like a flock of ducks.

No. 113. Herodias alba (Australian Egret).

These birds form a prominent feature in the avi-fauna of the vicinity of the Fitzroy River. Scarcely a lagoon or stretch of water in the river was passed without seeing one or more of these birds solemnly wading in the shallows in quest of prey, or sleeping on one leg. Although slow in its movements, the Egret is very shy, and considerable care is required to approach it within shot. A second species of White Egret, much smaller than the above, was seen, but at too great a distance to identify.

No. 114. Cereopsis novæ-hollandiæ (Cereopsis Goose).

Several of these birds were observed flying from islands to the mainland, as the "Australind" steamed down the west coast to the Australian Bight; and I was informed by Mr. T. Carter, a fellow-passenger, that they are occasionally shot near Carnarvon.

No. 115. Anseranas melanoleuca (Senipalmated Goose).

A small flock of these birds was observed at a lagoon about 100 miles south-east of Derby. I was informed that they are more numerous further east.

No. 116. Chlamydochen jubata (Maned Goose).

These birds were not by any means numerous, a few being seen near Lake Way, and a pair were shot at a fresh-water creek, near Lake Augusta. They were also found in small flocks at several lagoons along the course of the Fitzroy River.

No. 117. Nettapus pulchellus (Pygmy Goose).

Several flocks of these little Geese were seen on the south side of the Fitzroy River. They were very shy, and difficult to approach. When disturbed, they arose quickly, and flew near the surface of the water, making a peculiar whistling noise all the time they were on the wing. I was informed that several of their nests are generally found near together, but they were not breeding at the time of my visit.

No. 118. Casarca tadornoides (Chestnut-coloured Sheldrake).

Near Lake Way a pair of these Ducks passed our camp just out of range, and others were seen at three places near the Fitzroy River, either singly or in pairs.

No. 119. Dendrocygna vagans (Whistling Duck).

These birds were found in large flocks on the margin of the pools near the Fitzroy River. During the day they sleep under the shade of the bushes around the water, but at night travel out on to the open plains to feed. Whilst on the wing they keep up an incessant whistling noise, from which they derive their name. They deposit their eggs amongst the spinifex and cane-grass some distance from water.

No. 120. Dendrocygna eytoni (Eyton's Tree Duck).

The open plains near the Fitzroy River appear to be the stronghold of this species. Whilst travelling at night near Noonkoombah we frequently disturbed them in thousands as they were feeding amongst the dry grass, probably on the seed. Towards morning they return to the water, and after a short bath repair to the shelter of the bushes on the margin. These birds lie so close together when sleeping that seven or eight are often secured at one discharge. On several occasions I killed birds of the two species (*Eytoni* and *vagans*) at the one shot. Both species breed very freely in the coarse grass near Mount Campbell, and the natives in that neighbourhood make sad havoc amongst their eggs.

No. 121. Anas superciliosa (Australian Wild Duck).

A few pairs of these birds were found at most of the surface waters seen. At a large claypan east of Cue we saw old birds swimming with their young broods as early as June 29, and during August several immature birds were shot. In the neighbourhood of the Fitzroy River fresh eggs were taken during January and February, thus showing that the breeding season is largely influenced by the rainfall. On several occasions single birds of this species were seen flying in company with a flock of common Teal (*Anas gibberifrons*), and at one pool I shot one in company with *Nyroca australis*. Both birds were adults, and arrived at the water together. This habit of different species mingling together was noted on a much larger scale at some of the pools near the Fitzroy River.

No. 122. Anas gibberifrons (Slender Teal).

Until reaching the Fitzroy River this Teal proved to be by far the most plentiful species of Duck. They were found at all claypans and creeks passed, and frequently proved an acceptable

adjunct to our larder. On several occasions flocks comprised of about equal proportions of Teal and White-eyed Ducks were seen swimming or flying together. On our arrival at the camel depôt on August 10 I killed a young bird of each species at the one shot. They were unable to fly, and were the only birds on the creek at the time. Fresh eggs of the Teal were taken from hollow trees at the Fitzroy River during January and February.

No. 123. Malacorhynchus membranaceus (Pink-eared Duck).

A few of these birds were seen on a swamp near the telegraph station on the Fitzroy River during February, but they are not plentiful in any known part of West Australia.

No. 124. Nyroca australis (White-eyed Duck).

These birds were found scattered all over West Australia wherever fresh-water pools existed. Near Lake Way and the Fitzroy River they were particularly numerous, and many were shot for food. They were generally seen in flocks, but occasionally singly or in pairs. Owing to the density of their plumage, rapid flight, and dexterity in diving, they tax the skill of the sportsman in pursuit of them. The *Nyroca* is often found in company with Ducks of other species, particularly Teal.

No. 125. Podiceps cristatus (Australian Tippet Grebe).

Several birds of this species were seen at the Fitzroy River and also at some of the large claypans passed near Lake Way.

No. 126. Podiceps nestor (Hoary-headed Grebe).

On a large claypan about 20 miles east of Cue adult and young birds of this species were noted on June 29th. Others were afterwards observed on several pools near the Fitzroy River.

No. 127. Podiceps novæ hollandiæ (Black-throated Grebe).

A few isolated birds had been previously noted, but large numbers of them were see near Lake Way, and at the depôt Mr. L. A. Wells killed one on firing into a flock of Teal. These Grebes were also found at many of the swamps formed by the heavy rains near the Fitzroy River.

No. 128. Hydrochelidon hybrida (Marsh Tern).

On November 6th we found several birds of this species at a large lagoon near the Fitzroy River, but after the tropical rains they became more numerous, and were seen at the swamps along the course of the river until within a few miles of Derby.

No. 129. Sterna anglica (Long-legged Tern).

Several flocks of these Terns passed over our camp at the Fitzroy River, and I was informed that they were plentiful at several large swamps between the river and the Barrier Range. They were seen during April at a swamp within six miles of Derby.

No. 130. Graculus stictocephalus (Little Black Cormorant).

Although not by any means so numerous as the preceding species, these birds are found under similar conditions in the same locality.

No. 131. Graculus melanoleucus (Little Black and White Cormorant).

It is impossible to walk 100 yards amongst the dense timber on the margin of the Fitzroy River without disturbing numbers of these birds. After satisfying their hunger in the early morning, they resort to the shelter of the foliage of the Leichardt Pines and mangroves, where they remain motionless for hours. In many places the ground is perfectly white with their droppings.

No. 132. Graculus novæ hollandiæ (Black Cormorant).

Several birds believed to belong to this species were seen in the distance; but the first to come within shot was obtained at the camel depôt, where it came into the creek in quest of frogs, which were numerous there. These Cormorants were afterwards seen at the Fitzroy River.

No. 133. Pelicanus conspicillatus (Australian Pelican).

Along the course of the Fitzroy River large flocks of these birds are found. During the day they may be seen standing in groups on the sandy flats perfectly motionless, in such a manner as to suggest the idea of a small graveyard in the distance. They are so sluggish that the natives frequently kill them with their waddies, which they throw with surprising accuracy of aim.

A Note on the Nest and Eggs of Porzana fluminea.

By A. M. Morgan, M.D.

As the eggs of this bird are rare in collections, and as I am unable to find a description of them in any scientific writings, I take this opportunity of describing a clutch sent to me by Mr. Malcolm Murray, of Wirrabara. Mr. Murray writes :—"The Crake's nest was composed of grass, dry and green intermixed, placed above water level, in a bush growing in the water of a lake or swamp near Farina, on Myrtle Spring's Run." The eggs are five in number, and were taken on August 18, 1898. The ground colour is of a light olive-brown, with dark reddish-brown spots, more plentiful at the larger end, but not forming a distinct ring, some of the marking appear as if beneath the surface. At the larger end there are, in each egg, a few round almost black spots. Measurements :—(A) $1\frac{1}{4}$ in. x $\frac{15}{16}$ in., (B) $1\frac{1}{4}$ in. x $\frac{15}{16}$ in., (C) $1\frac{3}{16}$ in. x $\frac{15}{16}$ in., (D) $1\frac{5}{16}$ in. x $\frac{15}{16}$ in., (E) $1\frac{1}{4}$ in. x $\frac{15}{16}$ in. The eggs were accompanied by the bird shot from the nest.

On Deep-seated Eocene Strata in the Croydon and other Bores.

By Professor Ralph Tate.

[Read September 6, 1898.]

I. Croydon Bore (No. 2).

In the Trans. Roy. Soc., S. Aust., XIII., p. 188, 1890, I have given an account of the strata passed through in the Croydon-bore, which attained a depth of 800 feet below the surface. Therein the chief point of interest was the recognition of the Pliocene beds of the Dry Creek-bore, the fossiliferous development of which extended from 395 to 605 feet. At the time of the publication of my paper the boring was abandoned; subsequently a second bore-hole was commenced alongside the first, and was finally abandoned, 17/6/'93, after attaining a depth of 2,296 feet. The geological conditions revealed in the additional 1,496 feet have not yet been described; though the Conservator of Water has furnished details of thickness and description of strata to accompany the Engineer-in-Chief's report for the year ending June 30, 1893. Mr. Jones has obligingly placed to my use, for the present object, all the bore material preserved in his department.

Older Pliocene.

At from 470-475 in the Croydon-bores (No. 1 and No. 2) the assemblage of fossils was the same as in the Dry Creek-bore at about 400 feet, though the actual number of species was relatively small.

Fossils were again met with at 603-606 and at 705-715; the assemblage consisting of the larger species, which also occur at the highest level in the Croydon and Dry Creek-bores, and if viewed by themselves would have been pronounced Miocene. However, as they occur in association with an undoubted Pliocene fauna, they must be regarded as survivals from Miocene times.

A list of the determined species from the lowest levels is as follows :—

	603-60 feet.	705-715 feet.
Lampusia armata... ...	—	*
Natica balteatella ...	—	*
Spondylus arenicola ...	*	*
Pectunculus convexus ...	—	*
Cucullæa Corioensis ...	*	*
Crassatella oblonga ...	*	*
Divaricella Cumingi ...	*	*
Chione Cainozoica ...	*	*
Hemimactra Howchiniana ...	*	*
Corbula ephamilla ...	—	*

Below the depth of 715 feet no fossils appear till 778 feet, but the nature of the fossils there encountered do not permit of a decisive determination as to age, and this also applies to other occurrences. It is not until the fossiliferous bed at 970-1,000 feet is reached that undoubted evidence of Eocene age is forthcoming, which continues to 1,681 feet, the greatest depth yielding fossils.

EOCENE.

763—808. Calcareous silt, with much polyzoal debris, chiefly Celleporæ at 778 feet.

810—880. Fine yellow sands (polyzoal and echinodermal debris at 820—835).

880—928. Fine yellow calciferous sands (polyzoal and echinodermal debris at 905—910).

928—931. Yellow sandy clay with fragments of *Eupatagus* sp.

931—970. Fine yellow calciferous sand.

970—980. Fine yellow calciferous sand ; polyzoal and echinodermal debris, *Fibularia gregata* abundant.

1,060—1,090 Calciferous sandstone with some glauconitic coloration. *Pecten* sp. and polyzoa at 1,085.

1,126. Calcareous sand with shell-debris ; grey and bluish calciferous sandstone, more or less chalcedonic, and sand-rock. *Corbula pyxidata.*

1,200—1,230. Calcareous sand-rock.

1,282. Bluish friable calcareous sand-rock with shell-debris chiefly echinodermal and polyzoal). *Magasella lunata.*

1,376. Bituminous clay and black sand. *Turritella Aldingæ.*

1,681. Bituminous shale ; casts of Gasteropods in chalcedony, calcite, and iron-pyrites, some shell-matter. *Turritella Aldingæ, Mesalia stylacris, Fibularia gregata, Cellepora.*

2,155. Brownish sandy clay. No fossils.

2,175. Brownish sandy clay with included fragments of fine-grained sandstone. No fossils.

2,262—2,296. "Fragments of sandstone, chloritic slate, and limestone of primary age." Report by the Government Geologist.

List of Eocene Fossils

From the Croydon-bore (No. 2) at various depths between 970 and 1,681.

Turritella Aldingæ, *Tate.*
Mesalia stylacris, *Tate.*
Dentalium Mantelli, *Zittel.*
Dentalium subfissura, *Tate.*
Dimya dissimilis, *Tate.*
Lima Bassi, *T. Woods.*
Pecten Eyrei, *Tate.*
Pecten Flindersi, *Tate.*
Pecten Hochstetteri, *Zittel.*
Terebratulina catinuliformis, *Tate.*
Magasella lunata, *n. sp.*
Magellania Garibaldiana, *Davidson.*
Fibularia gregata, *Tate.*
Scutella marsupiata, *n. sp.*
Echinolampas Murrayanus, *Lambe.*
Pentacrinus and Antedon, *spp.*
Graphularia senescens, *Tate.*

Summary of Strata in Croydon-Bore (No. 2).

		Thickness.
Mammaliferous Drift	... ...	395
Older Pliocene (marine),	395—715	320
Eocene ? (marine),	715 – 760 = 45	
Eocene (marine),	760 – 1,681 = 921	
Eocene (unfossiliferous),	1,681 – 2,262 = 581	1,547
		2,262

General Remarks :—The sequence of deposits in the Croydon-bore compared with that as illustrated in the Kent Town-bore and immediate vicinity* reveals several disparities, when it is remembered that a distance of only about four miles separate the two areas.

The disparities between them are :—In the Croydon-bore, 320 feet of Marine Pliocene, absence of typical Miocene, a thousand feet of sandy beds with a paucity of Eocene marine fossils. In the Kent Town section, no marine Pliocene, a typical develop

*Tate, Trans. Roy. Soc., S. Aust., v., p. 40. 1883.

ment of Miocene, 149 feet of argillaceous and calcareous strata containing a typical Eocene molluscan fauna, and an infra-Eocene series of more or less carbonaceous beds 142 feet thick.

Professor David and Mr. Howchin* have sought to explain the stratigraphical relationships of these two dissimilar series of beds by the introduction of a north and south fault, ranging along the buried scarped front of the Archæan rocks, on which the Eocene and Miocene of the Adelaide plateau repose. This conjecture disregards the probability that physical conditions of varying character may have been the contributing cause of the lithological and organical disparities.

If the position of the Eocene in the Croydon-bore be due to a downthrow fault, then it might be reasonably expected that the very distinctive Eocene series of the Kent Town-bore would be repeated in the Croydon-bore ; but as such is not the case, I am of opinion that there is no direct evidence of a fault, and that the Kent Town series belong to a later period, and are more littoral in their organic contents.

The series of events that these sections teach us may be summarised as follows :—The Post-Cretaceous sea laved the base of the now subterranean escarpment of over 2,000 feet in vertical height, and at that measure the land stood relatively higher. Deposition and depression were synchronous over the submerged plain ; coincident therewith, wholly or in part, lacustrine and paludinal accumulations, preserved in the carboncceous beds of the Kent Town-bore, were formed on the higher ground. Finally depression submerged the terrestrial surfaces at Kent Town, and a more littoral life prevailed there in comparison with the earlier Eocene deposits. The Miocene deposition followed, succeeded by the extensive denudation of the Miocene and higher levels of the Eocene, and the removal of about 800 feet of the Eocene series, constituting the Adelaide Plain. Over this plain of marine denudation, Pliocene marine beds were accumulated, these of a more or less shallow-water origin, and over an area of depression; finally to be converted into a vast lacustrine area, in which land-drifts of about 400 feet have been accumulated.

II. Tintinara Bore.

Eocene-sands at a depth of 244-253 have yielded on the examination of further material the following list of species, which indicate a correlation to the lower series of the Aldingian beds, those in common marked with an asterisk.

*Marginella sub-Wentworthi
*Drillia, *sp.*

*P.L.S., N.S.Wales, xxi., tab. xl., fig. 1.

*Mesalia stylacris
*Natica Aldingensis
*Turritella Aldingæ
Cyclostrema, *sp.*
Calliostoma, *sp.*
*Actæon evanescens
Bullinella, *sp.* aff. cuneopsis
*Cylichnella callosa
*Dentalium Mantelli
Cadulus, *sp.*
*Lima Bassi
*Nucula Tenisoni
*Nuculana planiuscula
*Nuculana Huttoni
*Nuculana leptorhyncha
*Nuculana apiculata
Barbatia, *n. sp.*, aff. equidens
*Limopsis insolita
Verticordia *n. sp.*
*Cardita lattissima
*Carditella lamellata
*Carditella rugosa
Carditella, *n. sp.*
Trigonia semiundulata ?
*Chione Cainozoica
*Meretrix tenuis
*Tellina porrecta
Tellina, *n. sp.*
*Myodora lamellata
*Corbula pyxidata
*Terebratulina catinuliformis
Magasella, *sp.*
Ditrupa, *sp.*

III. Revised List of Fossils from Ki-Ki Bore.

Eocene sands at a depth of 380-424 feet. (Supplementary to Trans. Roy. Soc., S.A., 1896, p. 115).

*Trophon hypsellus
*Tritonidea, aff. apicilirata
*Marginella submicula
*Ancillaria ligata
*Clathurella apicilirata, *n. sp.*
*Trivia ovulatella
*Scalaria Mariæ
*Turritella Aldingæ
*Ataxocerithium concatenatum

Newtoniella, 5 *spp.*
Triforis, *spp.*
*Triforis, *sp.*
*Eulima, *sp.*
Turbonilla, *sp.*
Siliquaria occlusa ?
Rissoia, 3 *spp.*
Strebloramphus, *n. sp.*
Liotia Roblini
Leptothyra parvula
Leptothyra, *sp.*
Phasianella, *sp.*
*Calliostoma, *sp.*
*Euchelus, *sp.*
Patella, *sp.*
Puncturella psila, *n. sp.*
*Dentalium Mantelli
*Arca pseudonavicularis
Arca, *sp.*
*Limopsis multiradiata
Carditella, *n.sp.*, as at Tintanara
*Crassatella communis, *var*
*Chione Cainozoica
*Meretrix tenuis

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*Terebratulina Scoulari ?
Polyzoa, many *spp.*
Pentacrinius, *sp.*
Cidaris, *sp.*
Balanus, *sp,*
*Amphelia striata

Descriptions of New Micro-Lepidoptera from Queensland.

By A. Jefferis Turner, M.D.

[Read October 4, 1898.]

PLUTELLIDÆ.

I deal here only with the forms generally known as *Hyponomentidæ* and *Glyphipterygidæ*, which are included with the *Plutellidæ* by Mr. Meyrick in his recent work on British Lepidoptera. But few species are as yet known from this part of Australia, and I have but small addition to make to our knowledge. The genus *Glyphipteryx*, in particular, is much better represented in the southern part of the Continent.

Hyponomenta, *Latreille.*

I have two species referable to this genus, a definition of which may be found in Mr. Meyrick's work mentioned above. One with grey forewings bears the manuscript name of *H. paurocentera*, Meyr., the second I describe as new.

Hyponomenta paurocentera, *Meyr.* (MS.).

Brisbane and Warwick, Queensland.

Hyponomenta myriosema, *n. sp.*

Male, 22-28 mm. Head white. Palpi white; apex of second and middle of terminal joint annulated with black. Antennæ white, becoming dark-grey towards apex. Thorax white, with two black dots before middle and one at posterior apex; patagia white, with a small black dot on anterior margin. Abdomen dark-fuscous; apices of segments and tuft white. Legs white, with black annulations round apices of tarsal joints and tibiæ; anterior femora and tibiæ black on internal surface; black dots on middle and base of external surface of anterior and middle tibiæ; and on apex of middle femora. Forewings elongate slightly dilated posteriorly, costa moderately arched, apex rounded, hindmargin straight, slightly oblique; snow-white, with numerous black dots; one at base; six on basal two-fifths of costa; three to five beneath, but not on apical portion of costa; two rows in disc beneath centre of four to six each, that over anal angle slightly larger; two to five along hindmargin, sometimes partly fused; cilia snow-white, sometimes partly fuscous

on centre of hindmargin. Hindwings pale-grey, towards base whitish ; cilia white, sometimes grey around apex.

Brisbane ; three specimens, one of which was taken in August, the others undated.

ATTEVA, *Walker.*

British Mus. Cat., II., 526.

This genus has not yet been properly defined. It may be distinguished from *Hyponomenta* by the presence of vein 4 in hindwings. Walker's name can only be adopted by courtesy. I have not been able to refer to Zeller's definition of his genus *Oeta.*

ATTEVA NIVEIGUTTELLA, *Walk.*

Brit. Mus. Cat., II., 526.

This and the following are handsome insects, the forewings being orange-fuscous, with numerous white spots. In the present species the apical half of hindwings is dark-grey, in the following the hindwings are orange.

Brisbane ; also from India.

ATTEVA IMPARIGUTTELLA, *Z.*

Oeta impariguttella, Zeller, Horæ Ent. Soc. Ross.. XIII., 224. *Atteva impariguttella*, Moore, Lepid. Ceylon. Plate.

Brisbane and Cookstown, Queensland ; also from Ceylon.

POLYNESA, *n. g.*

Head smooth. Tongue well-developed. Antennæ three-fourths, in male filiform, moderately ciliated (one to one-half) ; basal joint without pecten. Labial palpi moderate, curved, ascending, second joint with appressed scales, terminal joint almost as long as second, rather stout, acute. Maxillary palpi rudimentary. Forewings vein 2 from three-fourths, 6 and 7 stalked, 7 to hindmargin, 11 from middle. Hindwings ovate, broader than forewings, cilia one-third, veins 2 and 4 stalked, 5 present, 6 and 7 approximated at base. Posterior tibiæ smooth-scaled.

POLYNESA MACULOSA, *n.sp.*

Male, 16 mm. Head white. Palpi white, base of second and apex of terminal joint dark-fuscous. Antennæ white, annulated with fuscous. Thorax white, with a black dot on base of each patagium. Abdomen ochreous-whitish. Legs white ; anterior and middle pair broadly annulated with dark-fuscous. Forewings elongate-oblong, not dilated, costa gently arched, apex rounded, hindmargin obliquely rounded ; white, with many large black dots, three at base, four on costa, three in a line above middle of disc, one in disc beneath the last of these, two on fold, one on inner-margin at three-fifths, three near and parallel to hind-

margin, the lowest touching it; a few black scales on hindmargin; cilia white, on apex and opposite last dot black, and with three black dots between these two. Hindwings whitish; cilia whitish, with a fuscous dot at apex, and traces of a medium fuscous line.

Brisbane; one specimen.

Hypertropha, *Meyrick.*

Hypertropha tortriciformis, *Gn.*

Brisbane, Queensland; also from Ballandean, Queensland, and Tenterfield, New South Wales, in February.

Hypertropha ametalla, *n. sp.*

Male, 17 mm. Head, face, and palpi dark-fuscous, irrorated with whitish scales. Antennæ dark-fuscous, towards base obscurely annulated with whitish. Thorax dark-fuscous. Abdomen fuscous. Legs whitish-ochreous, irrorated with dark-fuscous, tarsi annulated with fuscous; posterior tibiæ yellowish. Forewings oblong, posteriorly dilated, costa rather strongly arched, apex pointed, hindmargin markedly sinuate, slightly oblique; fuscous, irrorated with whitish, reddish-fuscous, and blackish scales; an obscure outwardly curved transverse blackish line from costa at one-third, not reaching inner-margin; indications of two fainter similar lines between this and base, and of five very faint parallel lines from costa beyond one-third, all lost in disc; an ill-defined blackish spot in costal portion of disc beyond middle; cilia fuscous, with metallic lustre; traces of metallic lustre are also visible in parts of disc by oblique light, and tend to form lines. Hindwings pale-yellow, with a broad fuscous line along hind- and inner-margins; cilia fuscous.

Closely allied to the preceding, but different, especially in the scanty development of metallic markings.

Armidale (3,500 ft.), New South Wales; one specimen.

Simæthis, *Leach.*

Besides those given below, Mr. Lower has described two species from Queensland (Proc. Roy. Soc. S.A., 1896, p. 167).

Simæthis sycopola, *Meyr.*

Brisbane.

Simæthis metallica, *n. sp.*

Female, 11 mm. Head, thorax, and abdomen fuscous, irrorated with dull orange scales. Palpi ochreous, annulated with fuscous. Antennæ fuscous with whitish annulations. Legs ochreous-whitish, with fuscous annulations. Forewings strongly dilated, costa rather strongly arched, apex rounded, hindmargin

oblique, slightly sinuate; dark-fuscous irrorated with dull orange-ochreous, a transverse, slightly wavy, bluish-metallic line from costa at one-fourth to inner margin at one-third; an irregularly curved bluish-metallic line from costa at three-fifths obliquely outwards, decribing a U curve in apical part of disc, and joining a short outwardly oblique similarly coloured line in middle of disc at five-sixths; a straight erect metallic line from inner-margin at two-thirds not reaching middle of disc; around this line is a dark-fuscous blotch; several fuscous and ochreous-orange areas in disc; cilia fuscous, apices whitish. Hindwings dark-fuscous; disc irregularly blotched and irrorated with dull-orange; cilia fuscous, with a pale basal line, and whitish apices.

Brisbane; one specimen.

CHORENTIS, *Hübner.*

Chorentis bjerkandrella, Thunberg.

Brisbane; sometimes abundant.

EUPSELIA, *Meyrick.*

EUPSELIA CARPOCAPSELLA, *Walk.*

Brisbane; two specimens in September.

EUPSELIA BEATELLA, *Walk.*

Female, 14 mm. Head, palpi, and thorax fuscous, finely irrorated with whitish scales. Antennæ fuscous. Abdomen dark-fuscous, irrorated with yellow scales, forming obscure annulations. Legs pale-fuscous, reddish-tinged; posterior pair yellowish. Forewings oblong, posteriorly dilated; costa gently arched; apex rounded; hindmargin obliquely rounded; fuscous irrorated with whitish scales, which tend to be arranged in transverse lines; the absence of these leaves a fuscous blotch on middle of inner-margin, sharply defined anteriorly, suffused posteriorly; a much larger, more ill-defined blotch, roundish, reaching from costa at three-fourths to anal angle; between the two blotches three incomplete fine transverse metallic lines are visible on oblique illumination; two small metallic spots between second blotch and apex; four or five black dots on lower half of hindmargin; cilia fuscous with a metallic basal line. Hindwings deep yellow, with a broad dark-fuscous hindmarginal band, produced along inner-margin to base; cilia fuscous with paler basal and median lines.

I have redescribed this species, Walker's description being insufficient and inaccurate. Unfortunately Meyrick was misled thereby into describing *E. carpocapsella* as this species (Proc. Linn. Soc. N.S.W., vol. V., p. 219). This is rectified in an appendix (ibid., vol VII., p. 184). From *E. carpocapsella* it is distinguishable by the absence of transverse lines from costa, the

inner-marginal blotch is common to both. In the former the hindmarginal band of the hindwings is also much thicker at the apex.

Brisbane ; one specimen in April.

EUPSELIA SATRAPELLA, *Meyr.*

Brisbane, in September ; Ballandean, Queensland, in February.

EUPSELIA THEORELLA, *Meyr.*

Brisbane ; two specimens in September.

EUPSELIA MELANOSTREPTA, *Meyr.*

Oxenford, near Brisbane ; one specimen in November. Tenterfield (3,000 feet), New South Wales ; one specimen in February

EUPSELIA ANOMMATA, *n. sp.*

Female, 14 mm. Head, face, and palpi ochreous-whitish. Antennæ pale-fuscous with blackish annulations. Thorax dark-purple fuscous, with a conspicuous anterior and posterior ochreous-whitish spot. Abdomen fuscous, tuft ochreous-tinged. Legs fuscous, posterior pair ochreous. Forewings moderate, somewhat dilated posteriorly, costa moderately arched, apex rounded, hindmargin obliquely rounded ; purple-fuscous, with violet metallic lustre ; a whitish blotch on inner-margin from one-fifth to three-fifths, not quite reaching costa ; a narrow whitish fascia from costa at two-thirds, two before anal angle, constricted in disc ; cilia dark-fuscous with a pale basal line, and pale apices. Hindwings fuscous, ochreous-tinged, especially towards base ; cilia fuscous with a pale basal line.

This handsome species differs from other members of the genus in the absence of hindmarginal dots.

Brisbane ; one specimen in September.

GLYPHIPTERYX, *Hübner.*

GLYPHIPTERYX ATRISTRIELLA, *Z.*

Zeller, Hor., Ross. (1877), p. 398, Meyr., l.c., p. 229. *Glyphipteryx chrysolithella*, Meyr., l.c., p. 230.

There can, I think, be little doubt of the identity of these two species. Brisbane specimens agree closely with specimens from Blackheath, New South Wales, having the hindwings golden-yellow, with broad blackish hindmarginal band. This constitutes the variety *chrysolithella*. On the other hand I have received a South Australian specimen from Mr. Lower in which the forewings are essentially similar, but the hindwings are fuscous, towards base mixed with yellowish, as in Zeller's description of his type, which was from Tasmania.

GLYPHIPTERYX IOMETALLA, *Meyr.*

Brisbane; very abundant in grassy places from August to October, flying near the ground and difficult to see.

GLYPHIPTERYX METEORA, *Meyr.*

Brisbane.

GLYPHIPTERYX CHRYSOPLANETIS, *Meyr.*

Brisbane and Ballandean, Queensland.

GLYPHIPTERYX PALÆOMORPHA, *Meyr.*

Recorded from Brisbane by Meyrick.

ŒCOPHORIDÆ.

At some future date I hope to publish a revision of this family. The present instalment is confined mainly to descriptions of new species.

AGLAODES, *n. g.*

Head with appressed scales, sidetufts small. Antennæ, basal joints moderate, without pecten (?); ciliations in male (unknown). Palpi long; second joint very long, much exceeding base of antennæ, with appressed scales slightly dilated at apex; terminal joint short (one-third of second), slender, acute. Thorax with a small posterior crest (?). Forewings with costa strongly arched. Hindwings narrower than forewings and much shorter, ovate; cilia two-thirds. Anterior tibiæ clothed with long hairs. Forewings with vein 7 to apex. Hindwings normal.

Although the generic characters cannot be fully determined from the single female specimen, its distinctness can hardly be doubted. The palpi and shape of wings are peculiar. It appears to come nearest *Epipyrga*, Meyr.

AGLAODES CHIONOMA, *n. sp.*

Female, 11 mm. Head whitish. Palpi whitish; second joint tinged with reddish externally towards apex. Thorax (rubbed). Abdomen ochreous. Legs whitish; anterior tibiæ with long reddish hairs, anterior tarsi reddish. Forewings strongly dilated posteriorly, costa strongly arched, apex obtusely rectangular, hindmargin slightly oblique, straight; fuscous irrorated with whitish and bright-red scales; a broad snow-white streak along basal third of costa; a red blotch on inner-margin before middle, containing a central yellow spot; a narrow red line along costa from one-third to two-thirds, thence in a strongly arched line to hindmargin above anal angle; beyond this, apical portion of disc is bright-yellow; cilia yellow, at anal angle fuscous, with a

few red scales. Hindwings much shorter than forewings, apex very obtusely rounded ; grey ; cilia grey.

This little moth is surpassed by none in its gaudy colouring, the contrast of bright-red, bright-yellow, and snow-white, on a fuscous background, being most striking.

Brisbane ; one specimen, in February.

Eulechria silvicola, *n. sp.*

Male and female, 11-13 mm. Head, face, and palpi pale-brownish-ochreous. Antennæ fuscous. Thorax and abdomen pale-brownish-ochreous. Legs ochreous-whitish ; anterior pair infuscated. Forewings oblong, costa slightly arched, apex rounded, hindmargin obliquely rounded ; pale-brownish-ochreous ; a minute fuscous dot in disc at one-third ; a larger dot in disc at two-thirds, prolonged by a transverse fuscous suffusion to before anal angle ; some fuscous scales in apical portion of disc, with traces of an outwardly curved line from costa to four-fifths to anal angle often obsolete ; cilia pale-brownish-ochreous. Hindwings and cilia pale-grey.

This small and inconspicuous species belongs to the group of *E. convictella*, from which it is distinguished by the absence of second discal dot, and the transverse mark formed by union of posterior dot with inner-margin.

Mount Tambourine, near Brisbane ; six specimens in November among dense tropical forest. I sent one to Mr. Meyrick, who pronounced it new.

Eulechria concolor, *n. sp.*

Male and female, 17-19 mm. Head, face, thorax, and abdomen pale-ochreous-brown. Palpi ochreous-brown, apex of terminal joint fuscous, external aspect of second joint sometimes fuscous. Antennæ fuscous. Legs fuscous ; posterior pair ochreous-whitish. Forewings elongate, not dilated ; costa moderately arched, apex rounded, hindmargin very obliquely rounded ; pale-ochreous-brown, without markings ; costal edge at base fuscous ; cilia pale-ochreous-brown. Hindwings ochreous-brown, very slightly darker than forewings ; cilia ochreous-brownish.

In Meyrick's tabulation this would come next to *E. alopecistis*, being distinguished by the absence of reddish tinge.

Common at Ballandean, Queensland, in February. I sent specimens to Mr. Meyrick, who pronounced it new.

Eulechria candida, *n. sp.*

Male and female, 17-23 mm. Head and thorax white. Palpi fuscous ; second joint white posteriorly and at apex. Abdomen fuscous, apices of segments whitish, tuft ochreous-whitish. Legs

whitish, anterior pair infuscated. Forewings elongate, not dilated, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; white without markings; cilia white. Hindwings pale or dark-grey; cilia whitish with a faintly-marked grey basal line. (Cilia about half.)

Variety. Forewings, head, and thorax suffused with greyish.

In Meyrick's tabulation this falls under the same heading as *E. cycnoptera* (Meyr.); but Mr. Meyrick informs me that it is not this species, from which it differs by broader hindwings (in *cycnoptera* these hardly equal cilia), longer palpi, and larger size.

Ballandean (2,500 ft.), Queensland; Tenterfield (3,000 ft.), and Armidale (3,500 ft.), New South Wales; taken commonly in February.

EULECHRIA CHRYSERES, *n. sp.*

Male, 15 mm. Head blackish; sidetufts and face orange. Palpi orange; second joint with a few blackish scales; terminal joint wholly black. Antennæ blackish, annulated with ochreous; basal joint orange, with a few black scales. Thorax orange; anterior margin and a posterior dot blackish. Abdomen dark-fuscous. Legs dark-fuscous, annulated with ochreous. Forewings narrow; costa slightly arched; apex rounded; hindmargin extremely oblique; scarcely rounded; bright-orange with black markings; costal edge black, except for short spaces at two-fifths and four-fifths; inner-margin black throughout; a basal patch not touching costa, extending to middle of inner-margin; a transverse fascia from costa at three-fifths to inner-margin before anal angle; dilated on both margins, and connected in disc with basal patch; a broad band along apex and hindmargin, with a few orange scales at apex; cilia black Hindwings and cilia grey.

Very distinct. In Meyrick's tabulation it falls under the same heading as *E. malacoptera*, Meyr., and *E. beliodora*, Meyr., being distinguished from both by the black markings.

Sandgate, near Brisbane; one specimen on a tree-trunk in July.

EULECHRIA DIAPHANES, *n. sp.*

Male, 14 mm. Head and thorax pale-yellowish, irrorated with dark-fuscous scales. Palpi pale-yellowish; second joint irrorated with dark-fuscous; terminal joint with a broad median dark-fuscous ring. Antennæ pale-yellowish, annulated with dark-fuscous. Abdomen ochreous-whitish. Legs ochreous-whitish, irrorated and annulated with fuscous. Forewings moderate, scarcely dilated, costa moderately arched, apex round-pointed, hindmargin oblique, slightly rounded in lower half; whitish, faintly yellow-tinged, very distinctly yellowish along costa;

rather thickly irrorated with dark-fuscous scales; the absence of these leaves a whitish dot in disc above middle at one-third, and a second before two-thirds; also an inwardly oblique triangular mark on costa at four-fifths, from which a curved line proceeds to anal angle; cilia whitish, yellowish-tinged, with a few scattered dark-fuscous scales. Hindwings whitish, thinly scaled, semi-transparent; a few pale-fuscous scales at apex and along hind-margin; cilia ochreous-whitish.

Very distinct from any other species by the yellowish fore-wings with fuscous irroration, and the semi-transparent hind-wings.

Mount Tambourine, near Brisbane, one specimen in November.

LINOSTICHA POLIOCHROA, *n. sp.*

Male and female, 12-13 mm. Head white, finely irrorated with fuscous. Palpi white; second joint fuscous at base, and with a fuscous subapical ring; terminal joint with a fuscous basal and subapical ring. Antennæ pale-fuscous; ciliations in male 3. Thorax white, finely irrorated with fuscous. Abdomen whitish-ochreous. Legs whitish. Forewings narrow, elongate, costa almost straight, apex round-pointed; hindmargin very obliquely rounded, white, finely irrorated with fuscous, and with darker-fuscous dots; a raised patch of scales in middle of disc at one-third and two-thirds, with a dark-fuscous dot beyond each; a third dot on fold obliquely below first; a fourth on inner-margin before anal angle; traces of short lines from base of costa along fold, and from costa at one-third to first dot; a dot on costa at one-half, and another at two-thirds; from the latter is a series of five or six dots parallel to hindmargin; cilia white, with a few fuscous scales. Hindwings and cilia whitish-grey.

In Meyrick's tabulation this would fall next to *L. helictis*, Meyr., distinguished by absence of inner-marginal blotch. It is, however, a much smaller insect, more resembling *L. anarcha*, Meyr., but without ochreous tinge. The raised scales are a peculiar character.

Mount Tambourine; two specimens in November.

PHILOBOTA RHODOPLEURA, *n. sp.*

Male, 21-22 mm. Head grey. Palpi grey; middle third of second joint, base, and apex of terminal joint dark-fuscous. Antennæ grey. Thorax and abdomen grey. Legs grey; anterior tarsi dark-fuscous, annulated with whitish; posterior tibiæ and tarsi whitish. Forewings moderate, oblong, costa moderately arched, apex obtusely rectangular, hindmargin slightly oblique, rounded beneath; grey; costal edge blackish at base, thence

pale-rosy to four-fifths ; a blackish dot in disc at one-third, a second before two-thirds, a third on fold obliquely beyond first ; a few scattered blackish scales in disc ; a partially obsolete blackish line from costa beyond middle, sharply angulated in disc at five-sixths, and continued thence to anal angle ; a row of blackish dots along apical one-fifth of costa and hindmargin; cilia grey. Hindwings grey, slightly infuscated in apical portion ; cilia grey.

This species has all the appearance of *Heliocausta*, but the presence of a pecten removes it from that genus. Among the described forms of Philobota it is conspicuously distinct in the uniform grey-colouring, with pink-costal edge of forewings.

Brisbane ; two specimens. Also one specimen at Stradbrooke Island in October.

PHILOBOTA MELICHRODES, *n. sp.*

Male and female, 15-16 mm. Head whitish-grey, without yellow tinge. Palpi fuscous ; second joint pale-yellowish internally, second and terminal joints whitish posteriorly. Antennæ fuscous. Thorax pale-whitish-yellow. Abdomen grey. Legs fuscous ; posterior pair ochreous-whitish. Forewings pale-whitish-yellow without markings ; extreme base of costal edge fuscous ; cilia grey, on costa whitish-yellow. Hindwings and cilia dark-grey.

Near *P. melirrhoa*, Meyr., but distinguished by the grey head and abdomen.

Brisbane ; two specimens taken in October.

PHILOBOTA COSMIA, *n. sp.*

Female, 18 mm. Head white. Palpi white ; basal third of second joint dark-fuscous. Antennæ dark-fuscous, sharply annulated with whitish. Thorax dark-fuscous; centre of anterior margin and a posterior dot white. Abdomen dark-fuscous. Legs ochreous ; anterior pair infuscated. Forewings posteriorly dilated, costa gently arched, apex round-pointed, hindmargin nearly straight ; oblique ; white, markings fuscous, ferrugineous-tinged ; a narrow basal fascia; a streak along costa to middle ; a broad transverse fascia before middle ; a third fascia from costa at two-thirds to anal angle, broad in disc, and containing a few white scales ; a narrow band along apex and hindmargin, not reaching anal angle ; cilia dark-fuscous, on costa and middle of hindmargin ochreous-whitish. Hindwings fuscous; cilia fuscous, with a paler basal line.

In Meyrick's tabulation falls with *P. lysizona* and *P. pruinosa*, from which it is readily distinguishable by the transverse fasciæ.

Brisbane ; one specimen in October ; and I have seen others of both sexes.

PHILOBOTA SORORIA, *n. sp.*

Female, 16 mm. Head snow-white. Palpi white, base of second joint dark-fuscous. Antennæ blackish. Thorax dark-fuscous, middle of anterior margin broadly white. Abdomen grey. Legs ochreous-whitish, anterior pair infuscated. Forewings somewhat dilated, costa slightly arched, apex round-pointed, hindmargin nearly straight, oblique ; white, the greater part of disc suffused or irrorated with fuscous ; a fuscous streak along basal third of costa, its anterior extremity prolonged to inner-margin ; on inner-margin near base is a large roundish snow-white blotch ; some irregular white areas on costa, inner, and hindmargin ; two discal dots faintly indicated ; cilia dark-fuscous, at apex and above anal angle whitish. Hindwings and cilia grey.

The male is not known, but it appears closely allied to the preceding, the fasciæ being lost in a general fuscous suffusion. It is certainly distinct.

Brisbane ; one specimen.

PELTOPHORA IDIOCOSMA, *n. sp.*

Male, 19 mm. Head (rubbed), palpi, and antennæ ochreous-whitish. Thorax pale-ochreous-whitish. Forewings dilated, costa slightly arched, apex tolerably acute, hindmargin very oblique, slightly sinuate ; pale-pinkish-ochreous, markings ochreous-fuscous ; an oblique line from base to inner-margin at one-fourth ; two oblique fasciæ parallel to this, first from costa near base to middle of inner-margin, second from costa at one-fourth to anal angle ; all three lines partly obsolete and suffusedly connected on inner-margin ; a fourth line from costa at two-fifths, dilated above anal angle, where it is confluent with second fascia, from thence it is bent upwards and continued to apex ; a triangular blotch on costa before apex ; cilia pale-ochreous, at apex fuscous. Hindwings ochreous-whitish ; cilia pale-ochreous.

Very peculiarly marked, and not like any other species.

Mount Tambourine, near Brisbane ; one specimen in November.

PELTOPHORA OSTEOCHROA, *n. sp.*

Male, 16-18 mm. Head, thorax, palpi, and antennæ whitish, faintly orchreous-tinged. Abdomen ochreous-whitish. Legs ochreous-whitish ; anterior pair infuscated. Forewings elongate-oblong, not dilated, costa strongly arched at base, thence straight, apex round-pointed, hindmargin obliquely rounded ; whitish, faintly ochreous-tinged ; a dark-fuscous dot in disc before middle, a second beyond middle, and a third on fold obliquely beyond first ; sometimes a fourth dot at anal angle tending to be united by a

fine line with second dot; cilia whitish. Hindwings whitish-grey; cilia whitish.

A simply-marked species, falling in Meyrick's tabulation with *P. amenena*, Meyr., from New Zealand, but distinguished.

Mount Tambourine near Brisbane, two specimens in November.

PELTOPHORA AUREOLA, *n. sp.*

Female, 16 mm. Head and thorax orange-yellow. Palpi yellow, second joint with a dark-fuscous dot on external surface at base and another before apex. Antennæ orange-yellow. Abdomen ochreous. Legs ochreous-whitish; anterior pair somewhat infuscated. Forewings moderate, somewhat dilated, costa moderately arched, apex round-pointed, hindmargin obliquely rounded: bright-orange-yellow, deeper towards hindmargin; markings blackish; a dot in disc before middle, a second beyond middle, and a third on fold obliquely beyond first; a fine line of dots from costa at four-fifths, outwardly curved in disc to anal angle; cilia deep-orange-yellow. Hindwings and cilia yellowish-whitish.

The orange-yellow forewings, together with the very simple markings, distinguish this species from any other. In Meyrick's tabulation it would fall next *P. coniætia* (Meyr.), from which it is separated by the blackish markings.

Mount Tambourine, near Brisbane; one specimen, in November.

SAROPLA PSAMMODES, *n. sp.*

Female, 15 mm. Head, thorax, and antennæ pale-ochreous. Palpi pale-ochreous; basal two-thirds of external surface of second joint fuscous. Abdomen pale-ochreous-fuscous. Legs dark-fuscous; posterior tibiæ and tarsi ochreous-whitish. Forewings moderate, scarcely dilated, costa moderately arched, apex tolerably acute, hindmargin oblique, scarcely sinuate; very pale-brownish-ochreous, irrorated sparsely with brownish scales, which form a suffused fascia from costa before apex to anal angle; a blackish dot in disc before middle, a second above middle, a third on fold obliquely below first, and two more almost confluent in disc beyond middle; cilia very pale-brownish-ochreous, at anal angle fuscous. Hindwings and cilia whitish-grey.

The colour of the forewings distinguishes it from other described species. The long terminal joint of palpi, almost as long as second joint, is another point worth noticing.

Brisbane; one specimen in August.

COESYRA IODETA, *n. sp.*

Female, 14 mm. Head dark-fuscous, face whitish. Palpi whitish. Antennæ whitish, with a few fuscous dots on upper

surface near base. Thorax bright-yellow, anterior margin and posterior extremity dark-fuscous; patagia wholly yellow. Abdomen fuscous. Legs whitish; anterior pair infuscated. Forewings moderate, costa moderately arched, apex round-pointed, hindmargin obliquely rounded; bright golden-yellow; a basal fascia from base of costa along inner-margin to one-sixth; an erect purple-fuscous mark from anal angle, reaching two-thirds across disc; a subterminal and a hindmarginal band of reddish-violet, containing a few scattered purple-fuscous scales; cilia yellow, at anal angle reddish-violet, with fuscous apices. Hindwings dark-grey; cilia grey.

A distinct species. In Meyrick's tabulation it falls with *C. philoxena*, Meyr., being distinguished from this by the absence of costal streak, and from most other species by the dark-fuscous sidetufts of head.

Brisbane; one specimen in October.

Crossophora nephelella, *n. sp.*

Male, 13 mm. Head and thorax whitish. Palpi whitish, terminal joint sparsely irrorated with blackish scales. Antennæ whitish. Abdomen ochreous-whitish. Legs whitish; anterior pair somewhat infuscated. Forewings narrow-elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; whitish, very sparsely irrorated with isolated blackish scales, especially towards margins; discal dots obscurely indicated by clusters of these scales, the first two often completely obsolete; cilia white. Hindwings and cilia whitish.

An inconspicuous little species easily overlooked. It comes nearest *C. thetias*, Meyr., but may be distinguished by the general irroration and obolescence of the discal dots.

Sandgate near Brisbane; three specimens beaten from *Melaleuca leucodendron* in August.

Psecadia, *Hübner.*

Head with appressed scales, side tufts small. Tongue developed. Antennæ three-fourths, in male thickened, sometimes serrate, with very short ciliations (one-fifth), pecten absent or represented by a few fugitive scales. Labial palpi moderate or rather short (sometimes long, *Meyrick*), second joint with appressed scales, terminal shorter. Forewings with 7 and 8 stalked, 7 to costa or apex. Hindwings rather broader than forewings, elongate-ovate, cilia less than one-fourth, 3 and 4 connate, 5 approximated to 6, 6 and 7 parallel. Posterior tibiæ hairy.

This genus was omitted from Meyrick's descriptions of Australian Œcophoridæ, but will be found defined in his work on

British Lepidoptera. I have three species referable to it. Two are here described; the third has white forewings, and resembles nearly examples I have received with the name *Psecadia postica*, Z., of which I have not yet seen the description.

Psecadia hilarella. *Walk.*

Azinis hilarella (Walker, Brit. Mus. Cat., XXVIII., p. 542; Moore, Lepid. Ceylon, III., p. 506, plate 209, fig. 3).

Male and female, 25-35 mm. Head whitish-grey, with two black dots posteriorly. Palpi whitish-grey, with black annulations, second joint with a basal and subapical, terminal with a basal and apical ring. Antennæ grey, with a black dot on basal joint; towards apex dark-fuscous. Thorax slaty-grey, with two pairs of black dots. Abdomen deep-orange with a cental black dot on first six segments. Legs grey, with black annulations; posterior femora orange. Forewings elongate, not dilated, costa moderately arched, apex rounded, hindmargin straight, scarcely oblique; slaty-grey with black dots; one at base of costa and of inner-margin, two just beyond these, one on costa at one-fifth, one on fold, two near inner-margin at one-fifth and two-fifths, two in a line beneath costa, and two in a line below middle of disc; five arranged in a circle beneath apex; a line of about ten on hindmargin; cilia dark-grey, apices paler. Hindwings golden-orange, with a triangular blackish blotch at apex; cilia dark-fuscous at apex, thence orange.

A large and handsome species, which must have an extensive geographical distribution. The antennæ in the male are somewhat serrate, but its close relationship to the following species shows that it must be referred to this genus.

Brisbane; also from Ceylon.

Psecadia heptasema, *n. sp.*

Male and female, 18-20 mm. Head whitish-grey Palpi whitish-grey, terminal joint blackish. Thorax grey, with two black dots on anterior margin; patagia whitish-grey, apex black. Abdomen pale-ochreous. Legs grey, with blackish annulations; posterior femora pale-ochreous. Forewings elongate, not dilated, costa moderately arched, apex rounded, hindmargin straight, slightly oblique; grey, with black dots; a black spot at base, with whitish-grey centre; a black dot on fold, a second beneath costa at one-fifth, a third in a line with second, two in centre of disc at about middle and three-fourths, and two more beneath apex; a row of four dots along hindmargin; cilia grey. Hindwings grey, towards inner-margin ochreous-whitish; cilia grey at apex, gradually becoming ochreous-whitish towards anal angle.

Brisbane.

Ceratophysetis, *Meyrick.*

Ceratophysetis sphærosticha, *Meyr.*

Proc. Linn. Soc. N.S.W. (1886), p. 1,045.

I have seen two specimens, the type in the Queensland Museum, and another, also male, in Mr. Dodd's collection. In the latter the anterior edge, which is twisted uppermost of the laterally compressed antennæ, is clothed with a brush of long whitish hairs; in the type these seem to be denuded. The posterior tibiæ are shortly rough-haired.

The genus must be referred to the immediate neighbourhood of *Psecadia*, Hb., from which it is only distinguished by the extraordinary antennæ of the male.

Definitions of Seven New Species of South Australian Polyplacophoræ.

By W. G. Torr, LL.D., and Edwin Ashby.

[Read October 4, 1898.]

Plates VI. and VII.

In the Proceedings of the Malacological Society of London, vol. II., part 4, April, 1897, appeared a very excellent paper by Mr. W. T. Bednall on the Polyplacophora of South Australia.

This painstaking article has paved the way for all future workers in this field, and the South Australian rocks are furnishing excellent opportunities for original research.

New species are constantly being discovered. Unfortunately, in several instances only one specimen of a species has been found.

The deep dredging operations of Dr. J. C. Verco has helped us very considerably, and has introduced several species not found near the coast.

To Mr. E. H. Matthews, of Yorke's Peninsula, we are deeply indebted for helping us to classify our specimens.

To Mr. M. M. Maughan and Dr. J. C. Verco our thanks are due for specimens supplied, and to Professor Ralph Tate for his kind advice and encouragement in preparing our work for the printer and engraver.

1. Chiton Vercouis, *n. sp.* Pl. 6, fig. 1.

General Appearance.—Shell oblong, much elevated, carinated, side slopes slightly curved and steep. Colour.—Flesh-coloured, variegated with creamy-white flecks. Third valve with more white than others; a broad blackish band running all medial areas.

Anterior Valve.—Ten riblets ornamented with strong elongated longitudinal tubercles. Teeth, eight slits.

Posterior Valve.—Mucro median, prominent. Ornamented with nine or ten riblets, composed of tubercles similar to anterior valve. Sinus moderately broad.

Median Valve.—Lateral areas ornamented with 12 to 14 pairs of strong elongated longitudinal tubercles, divided into two rows by a deep sulcus. The tubercles vary from opposite to alternate, the anterior being shorter than the posterior. Pleural areas covered with 14 to 16 longitudinal riblets, sometimes continued

into the dorsal area. Dorsal area smooth. The median valves each have one slit. The teeth under the microscope are pectenated; sinus broad and shallow. Inside colour creamy-white with bluish patches.

Girdle.—Clothed with imbricating scales, apices sub-erect, giving the girdle a rasp-like appearance. Scales pyramidal, apices smooth, base ornamented with eight to ten vertical riblets.

Measurement.—Length, 24 mm.; breadth, 12 mm.

Habitat.—Dredged in St. Vincent's Gulf, South Australia, by Dr. Verco and W. D. Reed. Aldinga, by W. Kimber.

Remarks.—It can easily be distinguished from allied species by the strongly raised longitudinal tubercles in the lateral areas.

2. Acanthochites crocodilus, *n. sp.* Pl. 6., fig. 2.

General Appearance.—Shell elongated, rounded, very broad in proportion to the girdle. Side slope curved. Colour pale-olive-green.

Anterior Valve.—Strongly radially ribbed with five ribs. Interspaces covered with more or less straight transverse rows of squamose pustules. Two slits only discoverable in broken specimen.

Posterior Valve.—Mucro median distinctly beaked; valve divided into dorsal and pleural areas; dorsal smooth and raised—pinnatifid—and pleural similar to corresponding area in median valves. Four slits. Sinus broad,

Median Valves.—Lateral areas distinctly raised. Anterior margin forming a strongly elevated diagonal rib, clothed with irregular raised squamose pustules, having a confluent tendency. Pleural area has a somewhat concave appearance, owing to the raised character of lateral and dorsal areas. The whole covered with triangular-shaped scales, which become very flat and large as they approach the anterior margin. Pustules and triangular scales are placed in longitudinal rows, continued through lateral and pleural areas. Dorsal Areas.—Triangular, smooth, each margin deeply notched with three to eight notches, prominently beaked. Teeth, 1-1.

Girdle.—Brown leathery, spongy, having on each side seven and on anterior valve four tufts of short brownish spicules. Microscopically mottled with white, and densely clothed with minute, irregular, opaque scales, which give it a rough appearance.

Measurements.—Length, 17 mm.; breadth, 8 mm.—in dried specimen.

Habitat.—Marino, South Australia; discovered by Dr. Torr.

Remarks.—Remarkable for strongly raised diagonal rib, and for its very coarse shagreening; some of the scales being fully half mm. across, and are microscopically striated.

3. Acanthochites cornutus, *n. sp.* Pl. 6, fig. 3.

General Appearance.—Shell elongated, narrow, decidedly carinated, side slopes very slightly curved. Colour light-yellowish-brown, mottled with white. Dorsal area whitish-brown.

Anterior Valve.—Radially ribbed with five ribs, the whole area being closely packed with bead-like granules.

Posterior Valve.—Very diminutive. Mucro post-median. Valve divided into dorsal and pleural area. Dorsal similar to same area in median valves. Pleural area covered with concentric rows of bead-like granules. The deep sulcations of the dorsal area are present on anterior margin to the outer edge of valve.

Median Valves.—Lateral area much raised, and thickly studded with imbricating granules. Pleural areas decorated with eight to ten longitudinal rows of distinctly raised pustules, considerably larger than the granules of the lateral area.

Dorsal Area.—Triangular, microscopically pinnatifid, which appearance is caused by three or more deep sulcations, continued into the pleural areas.

Girdle.—Narrow, having on each side seven sutural horny protuberances, covered with microscopic glossy granules. Whole girdle clothed with closely-packed microscopic imbricating semi-transparent scales. General colour yellowish, with splashes of brown.

Measurement.—Dried specimen: Width, 3 mm.; length, 8 mm.

Habitat.—Marino, South Australia; low tide. Discovered by E. Ashby. Only one specimen (not dissected).

Remarks.—The horny protuberances, absence of spicules, and transparent, closely-packed scales make this a very distinct species.

4. Acanthochites Verconis, *n. sp.* Pl. 7, fig. 4.

General Appearance.—Shell distinctly elongated carinated. Exposed portion of valves one-third total width in live specimen. Valves elevated. Posterior margin concave, prominently beaked. Colour of valves, pearly white, distinctly mottled with pink deepening to rose-pink at posterior margin.

Anterior Valve.—Clothed with somewhat flattened pustules, separated, oval, very distinct, smaller towards the apex, and arranged alternately. Teeth, five slits, with rays leading to apex.

Posterior Valve.—Mucro central, covered with flattened pustules rather longer and flatter than anterior valve. Dorsal area distinct and smooth. Sinus wide. Eight slits at irregular distances.

Median Valve.—Pleural area covered with ten to eleven diagonal rows of squamose pustules. Dorsal area raised, striated

showing distinct hastate to pinnatifid outline (pustulose under high magnifying power); one slit. Inside colour creamy-white to deep-pink.

Girdle.—Cream to deep-rose-pink, leathery, and encroaching on the sutures, destitute of tufts, covered with minute hairs.

Measurements.—Length, 10 mm.; breadth, 4 mm.

Habitat.—Dredged by Dr. Verco in St. Vincent's Gulf, South Australia, and taken at Aldinga Rocks by Dr. Torr.

Remarks.—This species is allied to *A. scutiger* of Reeve; his description is very incomplete. The girdle in *A. Verconis* is smooth and not densely bristled as in *scutiger*.

5. Acanthochites Maughani, *n. sp.* Pl. 7, fig. 5.

General Appearance.—Shell elongated oblong, carinated, side slope curved. Colour light-brown, with patches of yellowish-brown.

Anterior Valves.—Covered with concentric rows of pustules, large at base, and growing smaller towards apex.

Posterior Valve.—Mucro slightly post-median. Five concentric rows of pustules.

Median Valves.—Lateral and pleural areas, except that the former is yellower; both areas ornamented with six slightly radiating longitudinal rows of exceptionally elongated tubercles, inclined diagonally acutely backwards, touching the tegmentum almost the whole length, giving the appearance of riblets serrated on one side. Some tubercles are much bent over at the tip. Tubercles rough with microscopical granules.

Dorsal Area.—Linear raised granulose, intermittently covered with blackish specks. Longitudinally and transversely striate under the microscope. Apex of sixth valve black.

Girdle.—Light-brown, little darker than valves; leathery, loosely clothed with minute scales. Sutural tufts of short brownish spicules, and four tufts on anterior valve.

Measurement.—Length, 8 mm.; breadth, 4 mm.—dried specimens.

Habitat.—Port Victor, S. Australia; discovered by M. M. Maughan, Esq. Aldinga, by Kimber.

Remarks.—Easily distinguished from its allies by its narrow raised and granulose dorsal area and its exceedingly elongated appressed tubercles.

6. Acanthochites exilis, *n. sp.* Pl. 7, fig. 6.

General Appearance.—Colour porcelain-white, slightly mottled with very pale-brown. Dorsal area on third valve bright-red, oblong, rather broad, strongly carinated, side slope straight, beaked,

Anterior Valve.—Radially ribbed with five ribs, the whole closely covered with glossy pustules on a brownish ground.

Posterior Valve.—Mucro anterior. Pustules as in anterior valve; very small.

Median Valves.—Lateral areas raised, closely covered with slightly diagonal rows of highly polished pustules. Continued through pleural areas, but considerably larger and more raised, in some cases so closely packed as to suggest longitudinal riblets. Some rows are confluent.

Dorsal Area.—Triangular, broad; uniformly covered with somewhat distant, evenly distributed, slightly raised pustules, arranged in some valves in longitudinal rows. Tegmentum longitudinally striated. Ground colour of third valve deep rose-red; pustules less highly coloured. In valves 2, 4, 5, 6, 7 the dorsal area is often mottled with pink.

Girdle.—Spotted with cream and pale-brown. Very much crumpled in dried specimen. Covered with irregular scales. At the sutures prominent rough tubercles, from the centre of which a bundle of white or brown spicules is produced. Size, dried specimen: Length, 3 mm.; breadth, 1 mm.

Habitat.—Dredged by Dr. Verco in Spencer's Gulf and Investigators' Strait, South Australia, in 10 to 15 fathoms of water.

7. Acanthochites Tatei, *n. sp.* Pl. 7, fig. 7.

General Appearance.—Greenish-brown, spotted with pale-grey. Dorsal areas buff colour, with tinge of salmon-pink, in third valve dark-green. Girdle, mossy-green. Shape, oblong carinated, side slopes straight.

Anterior Valve.—Three very indistinct radial ribs closely covered with slightly elliptical pale-brown scales gradually decreasing in size to the apex. Ground dark-horn colour. Apex smooth transversely striated.

Posterior Valve.—Mucro post-median. Dorsal area triangular. The buff or salmon-pink colour extending over two-thirds of valve. Median area dark-brown, closely covered with elliptical irregular whitish scales.

Median Valves.—No distinction between lateral and pleural areas. Ground colour, ornamented with six or seven irregular radiating diagonal rows of whitish spathulate scales, which increase in size as they near the posterior margin.

Dorsal Areas.—Triangular, raised, beaked, smooth, decorated with transverse wavy markings, microscopically longitudinally and transversely striated. Third valve moss-green, and remainder buff with tinge of salmon-pink.

Girdle.—Olive-green, one-third of area. Mossy, owing to its being covered with short yellowish-white spicules, larger at margin, forming a dense fringe. Tufts, seven each side at intersection on valves. Four on anterior valves. Sutural tufts coarse and spear-shaped, closely appressed towards the apex of the valves. Specimen in formalin. Length, 6 mm. ; breadth, 2½ mm.

Habitat.—Middleton, Encounter Bay, South Australia ; one specimen only on rocks discovered by Dr. Torr.

EXPLANATION OF PLATES VI and VII.

a. Dorsal view of entire shell.
b. Anterior valve.
c. Median valve.
d. Posterior valve
e. Lateral view of posterior valve.
f. Portion of girdle magnified.
g. Life size, lateral view.

Fig.
1. Chiton Verconis, *n. sp.*
2. Acanthochites crocodilus, *n. sp.*
3. " cornutus, *n. sp.*
4. " Verconis, *n. sp.*
5. " Maughani, *n. sp.*
6. " exilis, *n. sp.*
7. " Tatei, *n. sp.*

Further Notes on Australian Coleoptera, with Description of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 4, 1898.]

XXIV.

PALPICORNES.

NEOHYDROBIUS (gen nov. *Hydrobiidarum*).

Mentum antice emarginatum; palpi graciles, labialibus brevibus, maxillaribus valde elongatis (quam caput prothoraxque conjuncti haud brevioribus), articulis ultimis 3 gradatim brevioribus; mandibulæ ad apicem bifidæ; labrum transversum antice late subemarginatum; clypeus antice emarginatus; oculi modici minus convexi; antennæ 9-articulatæ (articulis 1° magno, 2° sat elongato, 3°-5° brevibus, 6° majori 7^{mm} amplectenti, 7°-9° clavam formantibus); prothorax transversus; scutellum modicum triangulare; elytra ovalia nullo modo striata; pedes modici; tibiæ ad apicem bicalcaratæ, tibiarum anticarum calcaribus permagnis; tarsi modici; unguiculi maris antici inæquales valde arcuati et subtus ad basin lamina muniti; mesosternum postice carina brevi armatum.

Type (*Philhydrus*) *burrundiensis*. Blackb.

Since I described this insect (Proc. L. S., N.S.W., 1889, p. 447) I have obtained more specimens, including the male, and I find that its tarsal characters,—together with some other characters noted above,—are inconsistent with a place in *Philhydrus*. The original specimens were taken in the Northern Territory, but those received later are from N. Queensland.

PSEUDOHYDROBIUS (vide infra).

The remarkable insect for which I propose this name and which I have placed below (at the end of the *Palpicornes*), might on account of its tarsal characters be considered more naturally placed near *Neohydrobius*. It is therefore well to mention it in both places.

BEROSUS.

The known Australian species of this genus are now so numerous that it seems desirable to place a statement of their characters in a tabular form. I am doubtful whether the species

might not justifiably be divided into two genera, but as in that case the genera would both have to be regarded as distinct from *Berosus*, and as moreover they both completely resemble *Berosus* superficially I prefer to avoid the creation of these new genera. In the first of these groups the elytral sculpture resembles that of the European *B. affinis*, Brul., in having a short stria (not nearly reaching the middle of the elytra) between the 1st and 2nd complete striæ, but the structure of the mesosternum is quite different from that of *B. affinis* that segment being traversed merely by a fine elevated longitudinal line; while in the second group the stria between the 1st and 2nd complete striæ reaches more or less beyond the middle of the length of the elytra, but the mesosternal structure is identical with that of the European *B. affinis*.

I think I have before me examples of all the described Australian *Berosi* except *B. approximans*, Fairm., which is a very small species (Long., $1\frac{1}{2}$ l.) from Queensland of which the most notable character appears to be that the interstices of the elytral striæ are transversely wrinkled; it is possibly identical with *B. (Hygrotrophus) involutus*, Macl. Of the described species, however, one (*B. pallidulus*, Fairm.) seems to be identical with *Hygrotrophus nutans*, Macl., and therefore if *Hygrotrophus* is to stand (as I think it may) must be removed from *Berosus*. On the other hand *Hygrotrophus involutus*, Macl., as noted below seems to me to appertain to *Berosus*, and when these corrections have been made and two new species (described below) added there are 18 names that have been applied to Australian *Berosi*. One of these however (*B. externespinosus*, Fairm.) I regard as probably a synonym (of *Australiæ*, Muls.). One species as noted above (*B. approximans*, Fairm.) being unknown to me, the number to be dealt with in the following tabulation is 16.

A. Mesosternal carina not prominent in front of the intermediate coxæ; 2nd stria of elytra not nearly reaching the middle of the length of the elytra.
  B. Elytra spinose at apex.
    C. Apical spines of elytra comparatively short.
      D. Puncturation of elytral interstices equal or nearly so.
        E. Puncturation of disc of prothorax comparatively close and striation and seriate punctures of elytra comparatively strong.
          F. Base of the posterior 4 femora black or dark-fuscous.
            G. Head very elongate (size of insect about 4 l.) ... ... *gravis*, Blackb.
            GG. Head notably less elongate (size of insect about 3 l.) ... ... *Australiæ*, Muls.
          FF. Legs entirely clear testaceous ... *majusculus*, Blackb.
        EE. Puncturation of disc of prothorax notably more sparse, and striation and seriate punctures of elytra evidently finer ... ... *decipiens*, Blackb.

DD. Elytral interstices in front nitid and finely and sparsely punctured, behind opaque with close asperate punctures — *macumbensis*, Blackb.

CC. External spine at apex of elytra very long and slender (much longer than the scutellum) ... ... — *munitipennis*, Blackb.

BB. Elytra unarmed at apex.

C. Head testaceous or brown.

D. Striæ and seriate punctures of elytra strong (about as in *Australiæ*, Muls.) ... — *sticticus*, Fairm.

DD. Striæ and seriate punctures of elytra fine — *debilipennis*, Blackb.

CC. Head black or metallic.

D. Punctures of disc of prothorax very close (about as in *B. affinis*, Brul.)... ... — *Flindersi*, Blackb.

DD. Punctures of disc of prothorax evidently less close.

E. Clypeus extremely closely (almost confluently) punctured ... ... — *discolor*, Blackb.

EE. Clypeus notably less closely punctured.

F. Lateral striæ very much narrower than their interstices.

G. Interstice on either side of the short second stria bears a single row of well-defined punctures ... ... — *stigmaticollis*, Fairm.

GG. Interstice on either side of the short second stria with confused and faint puncturation ... ... — *auriceps*, Blackb.

FF. Lateral striæ about same width as their interstices ... ... — *ovipennis*, Fairm.

AA. Mesosternal carina prominent in front of intermediate coxæ (as in *affinis*, Brul.); second stria of elytra reaching at least to middle of length of elytra.

B. Punctures of prothorax very coarse (notably more coarse than in *affinis*, Brul.) ... — *queenslandicus*, Blackb.

BB. Punctures of prothorax much less coarse.

C. Size comparatively large (about 3 l.) .. — *duplopunctatus*, Blackb.

CC. Size very small (at most 2 l.) ... ... — *involutus*, Macl.

B. majusculus, Blackb. In Tr. Roy. Soc. S.A. 1892, p. 207, I expressed a doubt as to whether this species is really distinct from *B. externespinosus*, Fairm., and stated that I was unable to specify any structural characters to separate the two. I had not at the time examined a male of the latter, but having now seen a male I am able to say that *majusculus* is a valid species as the penultimate ventral segment in the male of Fairmaire's insect is even, having no trace of the dentation of outline that is so conspicuous in *B. majusculus*.

B. Australiæ, Muls. I think *B. externespinosus*, Fairm., may be regarded as identical with this insect. M. Fairemaire says that the latter is very near his species, but differs in the terminal spines of its elytra being of equal size and less widely separated; I can definitely assert, however, that there is quite as much variation as this expression indicates in the terminal spines

of specimens of *Berosus* taken in company and evidently conspecific. In all other respects the description of *Australiæ* fits M. Fairmaire's insect very well unless it be with regard to the striæ 4-6 of the elytra which Mulsant says are "postice læviores." I take this to mean that the punctures of those striæ are less conspicuous than of the others in the hinder part, and certainly this seems to be the case (at any rate from points of view) in several species (including *externespinosus*) although it is not so strongly marked in any species known to me that I should be inclined to attach much importance to it.

B. sticticus, Fairm. I have examples (from Queensland) of a *Berosus* which I refer doubtfully to this species. Their discrepancy with the description consists in the markings of the elytra (which are not constant), since I cannot find that in any of my specimens those markings fall in any distinct manner into the form of a semicircle. Whether or not, however, I am right in my identification *B. sticticus* is rightly placed in the tabulation as all the characters I have relied upon in placing it are characters mentioned in M. Fairmaire's description.

B debilipennis, sp. nov. Elongato-ovalis; testaceus, capite prothoraceque fusco-adumbratis, elytrorum striis puncturis maculisque nonnullis obsoletis et corpore subtus fuscescentibus; clypeo subtiliter sparsissime capite postice crebrius subfortiter, prothorace sat fortiter nec crebre (hoc antice sat angustato), punctulatis; elytris subtiliter striatis, stria 2ª longe ante medium desinenti, striis subtiliter punctulatis, interstitiis subseriatim (antice quam striæ haud magis subtiliter) punctulatis, elytris postice inermibus; mesosterni carina ante coxas intermedias haud prominenti. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

My unique example of this insect has unfortunately lost its front tarsi and therefore its sex cannot be determined. Its elytra simple at the apex and its testaceous head, in combination, distinguish it from all the other described Australian *Berosi* except *B sticticus*, from which it may be at once separated by its larger size, and by the much finer punctulate striæ of its elytra (which resemble those of *B. decipiens*, Blackb.). If my identification of *B. sticticus* be right it also differs from that species by its prothorax more narrowed in front.

Tropical Queensland (sent by Mr. Cowley).

B. auriceps, Blackb. In a "N.B." under this heading in Proc. Linn. Soc. N.S.W. 1889, p. 449, I drew attention to a specimen which I considered a possible var. of *auriceps*. The study of some *Berosi* recently received from Queensland has satisfied me that the specimen in question appertains to a species quite distinct from *auriceps* and which is *B. ovipennis*, Fairm.

B. queenslandicus, sp. nov. Ovatus ; minus elongatus ; obscure brunneus, capite et prothoracis disco nigris vix viridescentibus, elytris plus minusve piceo-vel nigro-adumbratis, antennis palpis pedibusque dilutioribus ; capite prothoraceque æqualiter crebre sat grosse punctulatis ; prothorace antice parum angustato ; elytris fortiter striatis, stria 2ª longe ultra medium elytrorum continua, striis fortiter (versus latera grosse, sicut interstitia quam puncturæ haud latiora sunt) punctulatis, interstitiis sublævibus, elytris postice inermibus ; mesosterni carina ante coxas intermedias prominenti (ut *B affinis*, Brul.).

I have seen only females of this very distinct species, which is of notably darker colour than any other Australian *Berosus* known to me and is easily recognizable *inter alia* by the very coarse puncturation of its head and prothorax.

Queensland.

HYGROTROPHUS.

I have received from Mr. Lea some specimens which he tells me that he has ascertained by comparison to be *H. involutus*, Macl. I cannot see any ground for regarding them as congeneric with *H. nutans*, Macl., or for separating them from *Berosus*. They seem, however, to be distinct from any other described *Berosus*.

H. DeVisi, sp. nov. Ovalis, sat elongatus ; nitidus ; supra pubescens ; testaceus, capite et prothoracis disco (hoc varie) viridibus vel cupreis, elytris varie plus minusve manifeste fusco-maculatis, corpore subtus plus minusve infuscato ; capite prothoraceque (hoc antice leviter angustato) minus crebre minus fortiter punctulatis ; elytris crebre subtilius subsquamose punctulatis, vix perspicue striatis vel seriatim punctulatis, postice inermibus ; mesosterni carina ante coxas intermedias haud prominenti.

Maris segmento ventrali penultimo simplici. Long., $1\frac{1}{2}$—2 l. ; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

Evidently congeneric with *H. nutans*, Macl., but very much smaller, with the head and disc of prothorax metallic-green or coppery.

Queensland ; sent by Mr. DeVis, Mr. Cowley, &c.

AMPHIOPS (?)

It is not without hesitation that I refer the following two species to this genus, as I have not seen an authentic type of it. It appears to have been unknown, except by description, to M. Lacordaire. In all important respects, however, the specimens before me agree very well with Erickson's diagnosis,

the only discrepancies being that the scutellum, although of the elongate triangular form described, cannot be called "small," and that the hairs on the intermediate tibiæ are scarcely "long." I have not been able to examine the mandibles, and therefore cannot say whether they are as described. The principal character of *Amphiops* seems to be its having four eyes—two above and two below the head—and this is the case with the insects before me, as the ocular canthus is carried along the exterior margin of the eyes quite widely, thus dividing each eye into two parts. The extreme convexity of these insects is such that (viewed from the side) the height of the elytra is as great as their length.

A (?) *australicus*, sp. nov. Breviter ovalis, valde convexus, ad latera compressus; nitidus; niger vel nigro-piceus, antennis palpis corpore subtus pedibusque plus minusve rufescentibus; capite (hoc permagno) crebre dupliciter, prothorace sparsim inæqualiter, elytris fortiter (in disco sparsim confuse, ad latera crebre seriatim) punctulatis; prothorace fortiter transverso, antice fortiter bisinuato, ad latera et ad basin rotundato; elytris nullo modo striatis. Long., $1\frac{4}{5}$ l.; lat. 1 l.

This species looks to a casual glance as if it might very well be congeneric with the species I described as *Volvulus punctatus*, but its eye structure is quite different. In respect of puncturation moreover it is very different especially on the elytra where the punctures are very much coarser. In *punctatus* the elytral punctures are not much less fine than in *Cyclonotum Mastersi*, Macl.

Tropical Australia; Northern Territory (Dr. Bovill; also Mr. J. J. Walker).

A. (?) duplopunctulatus, sp. nov. Breviter ovalis, valde convexus, ad latera compressus; nitidus; niger vel piceus, antennis palpis pedibusque rufescentibus; capite (hoc permagno) crebre dupliciter, prothorace dupliciter vix crebre, elytris dupliciter crebre (puncturis plurimis seriatim dispositis) punctulatis; prothorace fortiter transverso, antice fortiter bisinuato, ad latera et ad basin rotundato; elytris vix manifeste striatis. Long., $1\frac{4}{5}$ l.; lat., 1 l.

Differs from the preceding chiefly in respect of the elytral sculpture. In the present species the whole surface of the elytra is covered with comparatively close fine puncturation with which coarser punctures are thickly intermingled, the coarser punctures having a seriate arrangement (in scarcely defined striæ) on both the discal and lateral parts of the elytra as well as being mixed with the fine punctures all over the interstices. In *A.* (?)*australicus* the fine puncturation of the elytra is so fine and sparse as to need looking for, and in the sutural region (especially on the front

half of the elytra) the larger punctures also are very sparse and without seriate arrangement.

Queensland; sent by Mr. DeVis.

HYDROCHUS.

The description of the Australian members of this genus are so scattered through the literature of widely separated countries that it seems desirable to furnish some notes showing their relation to each other. I have therefore attempted to place their characters intelligibly in a tabular form, adding some remarks on some of them, and giving a detailed description of a new species. There is, however, one species that I have been unable to identify, viz., *H. obscuroæneus*, Fairm. I should judge from the description that it is near *H. Horni*, Blackb., but it may be at once distinguished from that insect by its having a fovea in the middle of the head between the eyes as well as by the well-defined sculpture of its prothorax and the implication that the alternate interstices of its elytra are not more elevated than the rest. I have before me a specimen which Mr. Lea tells me that he has ascertained by comparision with the type to be *H. parallelus*, Macl.

A. General colour dull-brown, pitchy, or obscurely æneous.	
B. Head not trisulcate between the eyes.	
C. Seriate punctures of the elytra so coarse as to leave no continuously defined interstices between some of the rows	*Adelaidæ*, Blackb.
*CC. Interstices between the rows of elytral punctures not obscured by the coarseness of the punctures.	
D. Alternate elytral interstices strongly carinate, in strong contrast to the others	*Victoriæ*, Blackb.
DD. Alternate elytral interstices not, or only feebly, more elevated than the others.	
E. Prothorax at base with four well-defined impressions separated by well-defined ridges	*regularis*, Blackb.
EE. Base of prothorax not having four well-defined impressions.	
F. Clypeus much more nitid and less coarsely punctured than the rest of the head (size comparatively large)	*diversiceps*, Blackb.
FF. Clypeus punctured like the rest of the head (size very small)...	*Horni*, Blackb.
BB. Head distinctly trisulcate between the eyes.	

* In *H. Victoriæ* some of the interstices are ill defined, but it is on account of rugulosity of sculpture, the punctures not being particularly large.

C. Interstices between the rows of elytral punctures all well defined.
D. The alternate elytral interstices scarcely more elevated than the others (size moderate).
E. Prothorax narrow and strongly narrowed at base ... ... *parallelus*, Blackb.
EE. Prothorax wider, subquadrate, not much narrowed at base ... ... *australis*, Motsch.
DD. The alternate elytral interstices conspicuously elevated (size very small) *interioris*, Blackb.
CC. Seriate punctures of elytra so coarse as to leave no continuously defined interstices between some of the rows ... *Palmerstoni*, Blackb.
AA. General colour bright-grass-green, with the legs yellow ... ... *læteviridis*, Blackb.

H. diversiceps, sp. nov. Elongatus; brunneus, obscure cupreus, clypeo suturaque viridescentibus, genubus tarsisque plus minusve piceo-notatis; clypeo subtiliter punctulato; capite postice indeterminate inæquali, rugulose punctulato; prothorace leviter transverso, postice sat angustato, indeterminate inæquali, sat grosse subrugulose punctulato, lateribus leviter sinuatis minus arcuatis; elytris suturam lateraque versus striatis, seriatim punctulatis (serierum subsuturalium puncturis quam ceterarum minoribus), interstitiis internis vix (externis manifeste) elevatis. Long., $1\frac{3}{4}$ l.; lat., $\frac{3}{5}$ l.

On each elytron the punctures of the two rows nearest to the suture are in indistinct striæ, and are smaller than the punctures of the other rows. The next two rows of punctures do not run in striæ; but the rest of the rows are in striæ. The seriate punctures (except those of the subsutural series) are about the same size as those of the European *H. angustatus*, Müll., and are larger than those of *H. parallelus*, Macl., and smaller than those of *H. Adelaidæ*, Blackb. The external interstices, beginning with that between the fourth and fifth rows of punctures, are somewhat elevated, especially near the apex.

Queensland; sent by Mr. DeVis.

H. interioris, Blackb. In re-studying this insect for the purpose of tabulation, I find with regret that the type was covered with some kind of exudation (probably the normal condition of the insect), which I overlooked; and the exudation now having, with considerable difficulty and some damage to the specimen, been removed, it appears that my description (Report of the Horn Expedition, II., p. 260) erred in respect of the sculpture, for the head, instead of being as I called it "æqualis," is trisulcate between the eyes, and the elytra should be described as "having all the alternate interstices a little more elevated than the rest, especially the fifth behind and the ninth in the middle," instead of (as is implied in my description) "only the fifth behind and the ninth in the middle more elevated than the rest."

OCHTHEBIUS.

O. brisbanensis, sp. nov. Minus latus; minus nitidus; piceo-niger, vix ænescens, pedibus antennisque rufescentibus; capite prothoraceque valde inæqualibus, vix perspicue punctulatis; hoc transversim quadrato (in disco sulco longitudinali mediano, sulco oblique in parte postica utrinque posita, et utrinque fovea antica, impresso), parte explanata laterali quam disci dimidium vix angustiori, lateribus fere rectis; elytris minus perspicue striatis, seriatim sat fortiter punctulatis, interstitiis sat planis, sutura elevata. Long., $\frac{4}{5}$ l.; lat., $\frac{2}{5}$ l. (vix).

The previously described Australian *Ochthebii* are *australis*, Blackb., and *novicius*, Blackb. The latter is a much larger species of considerably wider form. The former is of about the same size as the present insect, but more nitid, of a reddish-piceous colour and of somewhat wider build. Moreover the sculpture of its head is entirely different. Looked at obliquely from the front the head (excluding the clypeus) in *australis* is seen as divided into 5 elevations (2 ridges on either side placed one behind the other and a central tubercle); while the corresponding piece in the present species from the same point of view is seen as an area bearing a large deep fovea on either side of the middle the space between the foveæ being comparatively narrow and elevated like an obtuse ridge.

Queensland; near Brisbane; sent by Mr. DeVis.

HYDRÆNA.

H. evanescens, sp. nov. Ovalis; subnitida; obscure rufo-brunnea, capite nigricanti, prothoracis lateribus (nonnullorum exemplorum) pedibusque testaceis; capite vix perspicue, prothorace crebrius subtiliter, elytris subtiliter seriatim, punctulatis; prothorace leviter transverso, antice parum angustato, basin versus transversim (et prope angulum anticum subrotundatim) impresso; elytris postice obtusis, subtiliter seriatim punctulatis. Long., $\frac{3}{5}$ l.; lat., $\frac{1}{4}$ l.

This pigmy is distinguished from all the other described Australian *Hydrænæ* by its minute size. From *Torrensi*, Blackb., and *acutipennis*, Fairm., it also differs by its elytra being blunt at the apex; and from *luridipennis*, Macl., and *simplicicollis*, Blackb., by the much finer puncturation of its prothorax.

Queensland; sent by Mr. DeVis.

CYCLONOTUM.

C. Cowleyi, sp. nov. Late ovale; minus convexum; modice nitidum; rufum, elytris piceo-nigris; supra æqualiter confertim subtiliter punctulatum, sed elytris puncturis minus

subtilibus seriatim impressis; prothorace quam longiori ut $2\frac{1}{2}$ ad 1 latiori, antice angustato, margine antico fortiter bisinuato; elytris haud striatis, stria subsuturali etiam carenti. Long., 3 l.; lat., $1\frac{4}{5}$ l.

This species is very much more finely and closely punctulate than *C. Mastersi*, Macl. The absence of a subsutural elytral stria distinguishes it from all the other described Australian *Cyclonota*.

Queensland (Cairns); sent by Mr. Cowley.

NOTOCERCYON (gen. nov. *Sphæridiidarum*).

Palpi labiales breves; palpi maxillares modici, articulis 2° dilatato, 3° 4° que gracilibus inter se sat æqualibus; labrum vix perspicuum; oculi modici; antennæ ut *Cercyonis*: scutellum modicum triangulare; elytra pedesque ut *Ceryconis*; prosternum ut *Cercyonis*: mesosternum sat late lanciforme planum; corpus supra parce pubescens.

This genus differs from *Cercyon* chiefly by the form of the mesosternum which is flat as in *Megasternum*, though not quite so wide as in that genus and much longer. It differs from *Megasternum* in having the prosternum and tibiæ as in *Cercyon*.

N. ornatum, sp. nov. Ovale, postice acuminatum; convexum; parce pubescens; rufobrunneum, prothorace rufo, elytris testaceis (striis nigris, interstitiis interrupte nigro-maculatis, maculis fascias duas indeterminatas formantibus), antennarum clava nigra; capite prothoraceque subtiliter sat sparsim punctulatis; hoc fortiter transverso; elytris fortiter striatis, striis minus perspicue punctulatis, interstitiis subtiliter punctulatis (puncturis singulis capillas singulas ferentibus) convexis; metasterni mesosternique parte mediana planata sparsim punctulata. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

I met with two specimens of this insect, which are similarly coloured. The species differs from the following in its form acuminate behind, the evidently finer and sparser puncturation of its prothorax, and the much less close puncturation of the flattened surface of its meta- and mesosterna.

Victoria; Black Spur.

N. (*Cercyon*) *dorsale*, Er. I met with several specimens near Hobart of an insect which agrees very well with Erichson's description of this species, and I have it also from several localities in the Victorian Mountains. It is evidently congeneric with the species for which I have proposed the generic name *Notocercyon*. In colouring it presents considerable variety, the typical form (with which one of my Tasmanian examples agrees), has the piceous colour on the elytra in the form of a common

triangle with its base on the base of the elytra, but in most examples the piceous colour is more extended (leaving only the hinder part of the lateral margins and the apex testaceous) till in one of my Victorian specimens the whole elytra are of dark colour with only the apex somewhat lighter than the general surface. The most marked character distinguishing this species from the preceding consists in the close punctuation of the flattened portion of its sterna.

CERCYON.

Up to the present time two genuine species of *Cercyon* have been recorded as Australian, viz., *C. fossum*, Blackb., and (the doubtless imported) *C. flavipes*, Fab. I have now to record the following :—

C. quisquilium, Linn. I have an example of a *Cercyon* (taken to the best of my recollection near Melbourne) which seems to me to be this species. Compared with the specimen in my European collection the elytral interstices certainly seem to be a little less finely punctulate, but I can find no other difference, and have little doubt the insect has been imported into Australia.

PSEUDOHYDROBIUS (gen. nov. *Palpicornium*).

Palpi labiales breves graciles, articulo ultimo ovali quam præcedens sublongiori ; palpi maxillares minus elongati, quam capitis (inter oculos) latitudo vix longiores, articulis ultimis 2 longitudine sat æqualibus ; mentum quadratum ; labrum brevissimum sub clypeo fere abditum ; caput sat parvum ; oculi modici quam *Hydrobii* minus leviter granulati ; antennæ 9-articulatæ, quam palpi maxillares sesquilongiores, articulis 1° quam 11us sublongiori subcylindrico, 2° quam 1us triplo breviori, 3-6 gracilibus gradatim brevioribus (his conjunctis quam 1us 2us que conjuncti vix brevioribus), 7-9 clavam formantibus (7° 8° que inter se æqualibus, his conjunctis quam 11us paullo longioribus) ; prothorax transversus ; scutellum modicum ; elytra ovalia ; pedes modici sat graciles ; femora compressa ; tibiæ breviter ciliatæ ; tarsi modice elongati, articulis 1° perbrevi, 2° 5° que elongatis inter se æqualibus ; unguiculi simplices ; mesosternum æquale (*i.e.*, nec carinatum nec tuberculatum) ; corpus glabrum.

This genus is certainly, I think, allied to *Cyclonotum*, but it has the tarsi of *Hydrobius*, nine-jointed antennæ, and the mesosternum non-carinate. Its habits, moreover, associate it with *Cyclonotum* rather than with the true *Hydrophilides*. Probably M. Lacordaire would have treated it as a distinct tribe of *Palpicornes*.

P. floricola, sp. nov. Sat late ovalis; sat convexus; nitidus; supra brunneo-testaceus, capite prothoraceque in disco, et elytris præsertim latera versus, varie infuscatis; corpore subtus pedibusque rufo-brunneis; capite crebre minus subtiliter, prothorace minus crebre magis subtiliter, elytris (striis neglectis) fere ut caput sed minus crebre, punctulatis; elytris striatis, striarum (his apicem versus multo magis fortiter impressis) puncturis quam interstitiorum sat majoribus. Long., $2\frac{1}{2}$—$2\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l.

Victoria; on flowers near Fernshaw (Black Spur).

PHYTOPHAGA.

I have recently sent examples of a considerable number of the *Phytophaga* that I have described to the eminent specialist Mr. M. Jacoby, of the London Entomological Society, with the request that he would favour me with information regarding any of my determinations that he might consider incorrect. He has courteously responded to this request and has pointed out the following errors (which it seems desirable to place on record) in my work.

TERILLUS.

T. micans, Blackb. Mr. Jacoby informs me that this species is identical with *Alittus foveolatus*, Chp., and adds the information that he also regarded it as a *Terillus* and that it is the species he described as *T. porosus*. I have no doubt Mr. Jacoby has conclusive reasons for this determination (probably he has seen Chapuis' type) but it should be noted that Chapuis in his tabulation of the *Iphimeites* indicates as a leading character of *Alittus* that the lateral margins of the pronotum are perfectly straight ("*tout à fait droits*") which they are most emphatically not in this insect, and in the specific description says that the tibiæ are the same colour "*flavo ferruginiæ*" as the antennæ which they are not in any of the somewhat numerous specimens that I have seen of this insect. No doubt Dr. Chapuis incorrectly described his insect.

HALTICODES.

This genus (charactised by me Tr. Roy. Soc., S.A., 1896, p. 69 Mr. Jacoby says does not appear to him to differ from *Lactica* Dr. Chapuis gives as one of the main distinctions of the *Lacticites* the presence of a deep transversal prothoracic furrow "*limitè de chaque côté.*" In *Halticodes* the prothoracic furrow terminates laterally by arching round to the base; whereas I understood the expression "*limitè de chaque côté*" to indicate that the transversal furrow is cut off on either side by a longitudinal furrow at right angles to it (as in *Crepidodera*). I presume however that this is not the case, and in that event I do not know

any character on which *Halticodes* should be excluded from the *Lacticites*—or separated from *Lactica*. My *H. disparipes* is very distinct specifically from the only other *Lactica* yet described as Australian (*L. australis*, Duviv.).

AULACOPHORA.

A. Palmerstoni, Blackb. Mr. Jacoby informs me that this is not distinct from *A. abdominalis*, Fab.

MONOLEPTA.

M. alpina, Blackb. Mr. Jacoby states that this is identical with *M. minima*, Allard, which is, I think, the only *Galerucid* hitherto attributed to Australia of which I have not been able to see the description.

Use of the Wedge by the Natives of the Great Barrier Plain.

By John Harris Browne.

[Read October 4, 1898.]

In the years 1844 and '5 the great plain west of the Barrier Ranges, and extending northwards to the latitude of the Grey Ranges, had on it large patches of the *Acacia homolophylla*, the *Brigalow* of Western Queensland. These patches were often many square miles in area. The trees were from 8 to 12 feet in the stem, 5 to 8 inches in diameter, and sufficiently wide apart to enable a man to ride amongst them easily, although at a distance they appeared to form a thick impervious scrub. They were of great value to the natives. First, their seeds were an important article of food. For this purpose, when the seeds were nearly ripe, branches were torn off the trees and piled up in heaps on patches of bare ground, and when quite dry were thrashed with sticks. The seeds were then collected, winnowed on a rug, ground between two stones with water into a paste about the cousistence of thick gruel, and eaten from the grinding-stone with the bent forefinger, used as a spoon. Boomerangs and spears were made from the wood. For a boomerang a branch with the proper curve was selected, and an incision about an inch deep was cut into it at each end of the proposed weapon. Then the point of a yamstick or other piece of wedge-pointed wood that had been hardened in the fire was driven under the cut wood at the smaller end. A piece split off that required very little finishing to make it a perfect boomerang. Sometimes two or three were made off the same branch by deepening the cuts after each one had been split off. For spears a tree with a perfectly straight stem 10 or 12 feet long was cut down, the top cut off, and then split into halves and quarters by having wedge-shaped pieces of wood driven into the small end. The trees split very readily. I split a tree 10 feet long into halves with a single blow with an axe struck on its smaller end. The spears made from the tree in this manner were 9 to 10 feet long, from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter, chisel-pointed at one end, and with a blunt point at the other. They were never thrown, but were held in both hands, and used to thrust with in a charge. I believe they were peculiar to that district, for I never saw any of them north of the Grey Ranges. All the Acacia-trees seem to have died out, for when ten years ago I looked down upon the great plain from the top of Mount Robe, the only trees on it were a few pines and some mallee in scattered clumps.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1897-98.

ORDINARY MEETING, NOVEMBER 2, 1897.

W. L. CLELAND, M.B. (President), in chair.

EXHIBITS.—J. G. TEPPER, F.L.S., exhibited specimens of an *Aleurodid, Trioza sp.*, on Sterculia-leaves from Botanic Garden. The larvæ emit white waxy threads and coat surface of leaves with sugary fluid, which if not removed by ants or in other ways render plants sickly. Also some peach-tree aphis (*Myzus cerasi*), remarking they were difficult to remove by spraying. Also specimen of tick (*Ixodes muralia*), presented by Mr. Wirtheimer, and taken from a snake skin sent to him from Queensland. A. ZEITZ, Assistant-Director of the Museum, made some remarks upon Alexandra Parrot (*Spathopterus Alexandræ*) from Glen Edith, N.T., which had bred in captivity, but had not reared their young. Prof. TATE showed herbarium specimens of *Polypodium proliferum*, new for South Australia, from Cournamount, River Murray. Collected by the Rev. Henry T. Hull, of Mount Pleasant, who remarks that "there is no doubt of its occurrence in a wild state. On a recent visit I saw hundreds, if not even thousands, of plants" (25/10/97).

BALLOT.—W. G. Torr, LL.D., M.A., B.C.L., was elected a Fellow.

PAPERS.—"A Newly-discovered Cambrian Trilobite from Yorke's Peninsula," by R. ETHERIDGE, Jun. "Description of New Mollusca," by Professor TATE.

ORDINARY MEETING, DECEMBER 7, 1897.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited and described palæolithic implements from the brick-earths of Sussex, and

gravels of France, from Madras Presidency, and from Somaliland.

PAPER. — "On Some Australian Insects of the Family Psyllidae," by W. M. Maskell, of Wellington, N.Z.

S. DIXON reported result of the deputation to the Minister of Education in reference to preparing a manual on insectivorous birds and predatory insects for use in Public Schools.

ORDINARY MEETING, APRIL 5, 1898.

PROF. TATE, F.G.S. in the chair.

EXHIBITS.—Prof. TATE showed pieces of prismatic sandstone from the Hawkesbury series, N.S.W. and Western Victoria. Also some "limestone biscuits" from Biscuit Flat, S.E.; having referred to certain speculations of Rev. J. Tenison Woods in his work on South Australian Geology, 1862, as to the origin of these biscuits, he went on to describe the appearance of the biscuits—their highly calcareous nature. A section through the narrow part shows concentric rings around a central spot or space, and in several examples a fresh water shell (*Bulinus*) is found to be the nucleus. Mr. Thomas Smeaton wrote describing some observations made by him some 30 years ago on limestone biscuits from S.E. and elsewhere, and came to much the same conclusion as Prof. Tate.

MR. TEPPER, F.L.S., showed a piece of green opal from Coolgardie, W.A. Also a pupa of codlin moth obtained from apple stem between three apples, and which had made a nest in a bottle where it had been placed subsequently.

A. ZEITZ, Assistant Director of Museum, brought under the notice of the meeting a small green pigeon (*Chalcophaps chrysochlora*) caught at Bews near Kadina, very rarely found so far South, its proper home being Queensland and New South Wales. Also a small fish of the perch tribe *(Chelmo truncatus)* and of the scaly finned family, so named because the dorsal and anal fins are thickly covered with scales. Also an unusually large specimen of the blue-tongued lizard (*Cyclodes gigas*) from Leighs Creek; about 18 inches long.

PAPERS.—"Description of new Coleoptera," by Rev. Thos. Blackburn, M.A.

ORDINARY MEETING, MAY 3, 1898.

W. L. CLELAND, M.B. (President), in the chair.

OBITUARY NOTICE.—J. G. O. TEPPER, F.L.S., drew attention to the death of W. M. Maskell, of Wellington, N.Z., a corresponding member of the Society. It was decided to send a letter of condolence to the Hon. Secretary of the Philosophical Society, Wellington.

Exhibits.—W. Howchin, F.G.S., laid on table a photograph of a large erratic boulder transported by glacial action some ten miles up the Inman River Valley.

Papers.—"Further Discoveries of Glacial Remains in South Australia," by W. Howchin, F.G.S.; "The Influence of Vegetation on Climate and the Rainfall," by J. G. O. Tepper, F.L.S.

Ordinary Meeting, June 7, 1898.

W. L. Cleland, M.B. (President), in the chair.

Exhibits.—Prof. Tate, F.G.S., exhibited a grass (*Aristida depressa*) from Mount Lyndhurst (collected by Mr. Koch) new to South Australia. Also a sedge (*Cyperus lævigatus*) from River Hindmarsh (collected by Miss J. L. Hussey), first found in South Australia at Nilpena, but in an extreme varietal form, and this year J. H. Maiden, Government Botanist of N.S.W., has received a specimen of it from Mount Lyndhurst. The Port Elliot plant, which in its Schœnus-like habit represents the typical form widely spread over warmer regions of the world, chiefly in maritime districts, has hitherto only been known for Australia at Swan River, W.A.

J. G. O. Tepper, F.L.S., exhibited a cocoon of an insect on an eucalypt bough curiously simulating a *Serpula*.

Edwin Ashby showed *Callochiton platessa*, *Acanthochites speciosus*, and *A. asbestoides*, and small medusa from Aldinga.

Papers.—"Respecting Contact Metamorphism occurring at Kalgoorlie, W.A.," by H. B. Corbin; "On two Deep Level Occurrences in South Australia of Recent Marine Deposits," by Prof. Tate.

Ordinary Meeting, July 5, 1898.

W. L. Cleland, M.B. (President), in the chair.

Exhibits.—A large series of specimens from White Cliffs, illustrating pseudomorphism by noble opal, by Prof. Tate, the property of the School of Mines. These included scalenohedra after calcite, opalised sandstone, reptilian humerus, Ichthyosaurian vertebra, wood-structure, and various molluscan tests.

W. Howchin, F.G.S.—A piece of quartzite with polished surface, taken from a large bed of the same rock in the Onkaparinga watershed, exhibiting pseudoglacial features; a piece of black flint pseudomorph after calcite, from Wallaroo Mines; also specimens showing rock-faulting, contortion, and interrupted jointing, and others illustrating various geological phenomena.

PAPER.—"On a new Myoporum from South Australia," by J. H. MAIDEN and E. BETCHE.

Dr. STIRLING, M.D., F.R.S., moved the following resolution (Prof. TATE seconded. Carried.):—"That whereas the aborigines of Australia are rapidly disappearing, it is desirable, in the interests of science and of our successors, that a comprehensive and enduring record of the Australian race, in the fullest anthropological and ethnological significance, should be taken before it is too late; that this Society communicate with the Royal Societies of Victoria, New South Wales, Queensland, and West Australia and the Linnean Society of New South Wales, with the object of asking whether those Societies will join in a combined movement, together with such other scientific bodies as may be interested, to induce the Governments of their respective colonies to promise contributions of say £500 from each colony, payable in such annual instalments as may be necessary to defray the expenses of such a work; that contingent upon the approval by this Society of the above resolution, the Council be requested to put it into effect by forwarding copies to the bodies mentioned."

ORDINARY MEETING, AUGUST 2, 1898.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—A. ZEITZ, Assistant-Director of the Museum, specimen of Leatherjacket (*Monacanthus*, sp.), with abnormal dorsal spine from St. Vincent's Gulf. Also a blue ruff-heron (*Demigretta jugularis*) from Wallaroo. It is found in tropical Australia, but rarely so far south. S. DIXON specimens of telluride ore, carrying 40 per cent. of gold, in schistose rocks from the Kalgurlie Mine, W.A. W. HOWCHIN, F.G.S., gave an interesting description of foraminiferal sand, obtained through the kindness of Prof. David, of Sydney, and Mr. Geo. Sweet, of Melbourne, from the Funafuti Atoll, and from the bore put down to test the nature of the underlying rocks. The beach consists largely of nullipore fragments sometimes consolidated into rock masses. The foraminifera are not very abundant in their variety, but form almost the entire mass of the beach sand, and belong to eleven genera, including sixteen species, and present an almost identical facies with those of the fossil fauna of the lower tertiaries of Southern Australia. Organic remains from the bore at 150 feet were scarce; those from the 400-feet depth were more abundant, particularly amphistegina, which made up the most of the rock materials, and were in each case characteristically of shallow water species, which would seem to indicate subsidence of the

platform on which the atoll rests. A photograph of Funafuti was was also shown.

Ballot.—E. Meyrick was elected an Honorary Fellow.

Papers.—"Two new species of Cretaceous Mollusca." "New species of Eulimidæ and Pyramidellidæ;" Revision of the Australian Cyclostremidæ and Liotiidæ [Publication unavoidably postponed]. The author points out that great diversity of opinion has prevailed as to the correct systematic position of the component species; some under different generic names have been placed in both families. The limits of the genera of Cyclostremidæ are better defined, and the following two new genera are proposed:—(1.) Cyclostremella, type *Liotia Loddercæ*, Petterd, is separated by its varicosely margined aperture; (2) Pseudoliotia, type *Cyclostrema micans*, A. Adams (= *Liotia Angasi*, *Crosse*), is defined as somewhat like *Liotia*, with a thick porcellanous (non-perlaceous inside) test, aperture oblique, its margin thickened, operculum horny and multispiral, without a granulose exterior. *Cirsonella*, Angas, falls as a synonym under *Tubiola*, A. Adams, in the family Cyclostremidæ; "On some Recent and Fossil Species of Philobryæ," by Prof. Tate, F.G.S.

Ordinary Meeting, September 6, 1898.

W. L. Cleland, M.B. (President) in the chair.

Ballot.—Mr. Edwin Ashby was unanimously elected an auditor.

Papers.—"Notes on Australian Lepidoptera," by Dr. A. Jefferis Turner; "Lists of Plants on Mount Lyndhurst Run," by M. Koch; "Deep-seated Eocene Strata in the Croydon and other Bores," by Prof. Tate, F.G.S.

Annual Meeting, October 4, 1898.

W. L. Cleland, M.B. (President) in the chair.

Exhibits.—Prof. Tate exhibited botanical specimens collected by Mr. C. F. Johncock from the neighbourhood of Mount Remarkable—these were: the geococcus state of *Blennodia cardaminoides*, *Kennedya prostrata*, leaves of *Xanthorrhœa quadrangulata* from the summit of the Mount, *Solanum lacunarium*, *Adiantum æthiopicum*, and *Pterostylis pedunculata*. Rev. Thos. Blackburn, B.A., exhibited obsidian bombs.

Annual report and balance-sheet were read and adopted.

Election of Council.—President, W. L. Cleland, M.B.; Vice-Presidents, Prof. Tate, F.G.S., and W. Howchin, F.G.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Sec., G. G. Mayo, C.E.;

Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., Rev. Thos. Blackburn, B.A., S. Dixon, J. S. Lloyd, and W. H. Selway; auditor, Edwin Ashby.

Presidential Address was read by the PRESIDENT, and upon the motion of Prof. TATE, seconded by Prof. STIRLING, was ordered to be printed in the Society's Transactions.

PAPERS.—"The Use of the Wedge by the Natives of the Great Barrier Plain in making their Boomerang and Spears," by John Harris Browne. Report on the Birds collected on the Calvert Expedition, by A. J. NORTH, C.M.Z.S., and G. A. KEARTLAND. "Dimorphism in South Australian Cruciferæ," by Prof. TATE, F.G.S.; "Descriptions of New Microlepidoptera," by Dr. A. J. TURNER; "Notes on the Nest and Eggs of *Porzana fluminea*," by Dr. A. M. MORGAN; "Descriptions of seven New Species of South Australian Polyplacophora," by Dr. TORR and E. ASHBY; "Descriptions of New Australian Coleoptera," by Rev. T. BLACKBURN.

ANNUAL REPORT.

The Council reported that the scientific work of the Society had been steadily carried on during the year. Part 1 of vol. XXII was ready for distribution in August.

Prof. Tate, F.G.S had been engaged in making a revision of the Australian Cyclostremidæ and Liotiidæ, and had also made independent observations of the Calcareous Biscuits from the South-Eastern district of the colony. W. Howchin, F.G.S., had discovered further traces of glacial action in Hindmarsh Valley, and a Trilobite from Yorke's Peninsula, which R. Etheridge, jun., of Sydney, has described as Ptychoparia Howchini.

Valuable papers have been contributed during the year by Prof. Tate, F.G.S., Dr. Verco, Rev. Thos. Blackburn, B.A., the late W. M. Maskell, J. H. Maiden, Dr. A. J. Turner, and J. G. O. Tepper.

Exchanges of publications have been accepted with various scientific bodies. The Council have to report the death of a corresponding member, W. M. Maskell, the late Registrar of the University of New Zealand, who had shortly before his lamented death forwarded a valuable paper to the Society.

A movement has been initiated by Prof. Stirling for obtaining the support of the various Colonial Governments and learned societies in an organized attempt to collect and preserve all ethnological and anthropological information relative to the aborigines of Australia.

During the year J. H. Maiden, Director of the Botanic Garden, Sydney, and E. Meyrick were elected Honorary Fellows.

The membership of the Society is as follows:—10 Hon. Fellows, 9 Corresponding Members, 70 Fellows, 1 Associate.

Early in the year Mr. Sam. Dixon initiated a discussion on the advisability of securing the dissemination of reliable information respecting the insectivorous birds and useful insects of South Australia. After discussing the matter at several meetings, a Sub-Committee, consisting of the President, Prof. Tate, Messrs. S. Dixon, J. G. O. Tepper, and W. C. Grasby, was appointed to take such steps as they considered necessary. The Committee invited the co-operation of the Royal Geographical Society, Royal Agricultural Society, the Zoological Society, and the Agricultural Bureau. All these Societies decided to assist in attaining the objects of the Sub-Committee, and a meeting of the representatives was held at the University, when it was decided to wait on the Hon. the Minister of Agriculture and Education.

The Minister promised to make enquiries and decide what action the Government would take. No official reply has yet been received.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
October 1st, 1897.						
To Balance				91	4	3
" Subscriptions—						
Royal Society	74	16	0			
Field Naturalists' Section	15	0	0			
Malacological Section	3	10	0			
				93	6	0
" Grant from Government				76	18	2
" Interest				2	18	9
				£264	7	2

Cr.	£	s.	d.	£	s.	
By Cost of Transactions—						
Printing	58	5	0			
Illustrating	9	5	0			
Publishing...	7	9	0			
				74	19	0
" Wages—Caretaker				4	0	0
" Printing, Postage, and Stationery ...				7	7	2
" Library—Carriage and Shelving ...				4	10	8
" Grants-in-aid—						
Field Naturalists' Section	10	0	0			
Deputation *re* Insectivorous Birds ...	0	9	7			
				10	9	7
" Exchange on Cheques				0	1	9
" Balance in Savings Bank, Oct. 1st, 1898				162	19	0
				£264	7	2

Audited and found correct,
EDWIN ASHBY, Auditor.
1st October, 1898.

WALTER RUTT, Hon. Treasurer.

PRESIDENT'S ADDRESS.

During the year now ending the Society has received various valuable contributions on matters relating to natural history and geology, which are the sciences that in a new country are the most prolific in furnishing original papers and monographs. The object of this Society as a scientific body is to place on record only new facts relating to science as they bear on South Australia. This is the rule of the various learned Societies of the Australian Colonies, so that the proceedings of this Society should reflect the increase to our scientific knowledge respecting South Australia in any given year. The thanks of this Society are certainly due to those science-workers who loyally forward the results of their labours on South Australian subjects to be incorporated in our proceedings. To some of the Fellows it may be a matter of regret that attempts have not been made by the Council to place scientific subjects in a popular form before the meetings. It should be remembered, however, that the functions of a Royal Society are not to popularise science nor to give instruction, but simply to publish results of work done or to discuss the deductions which may legitimately be drawn from ascertained scientific data. Our workers are, however, so few, and each one is almost necessarily an authority on his own particular speciality, that the opportunities for profitable discussion do not often present themselves for want of a sufficient number of those who would be entitled to speak *ex cathedra*. Again, the existence of the University as a rallying focus for anyone interested in science, as there are to be found some of our chief exponents of various branches of science, also tends to deprive the meetings of this Society of one of its objects, namely, a common meeting ground for the exchange of scientific thoughts. As to the popularising of science, this Society might possibly have taken up the matter if it were not being already done in a pre-eminently satisfactory manner by the University and the branches of the Society. For this Society to attempt to do the same would be superfluous, and anything that is unnecessary is certain to be mischievous. It is no object of this Society to enter into competition with other institutions, and although it may be a matter of regret that our meetings are not as well attended as they might be, yet the regret is not on account of the smallness of the audience, but of the smallness of the band of science

workers. It has, however, been already stated that many of our workers do not attend the meetings because they have had opportunities elsewhere of meeting those with whom they are in science matters *en rapport*. The utility of this Society is therefore not to be measured by the number who attend the meetings but rather by the bulk of its published memoirs. The intrinsic value of the contributions has always maintained a very high scientific standard. It must also be remembered that each of these contributions necessitates a vast amount of labour and minute and painstaking investigation, so that although the quantity may not always be great, the quality is unimpeachable. Another obstacle to the size of our proceedings has been at times the question of ways and means, and the study of certain subjects has had to be postponed owing to the unlikelihood of the Society being equal to the necessary expenditure. As an example may be cited what has been done with regard to the unique Callabonna fossils. In 1894-5 a beginning was made by describing and illustrating certian bones of *Genyornis Newtoni*, but since then there has been no further publication. On those who can afford to wait fortune in the end generally condescends to smile and so it is in this case. There is now every certainty that the work will be pushed on with vigour, as the Government has generously, and with a due appreciation of the scientific value of the work, caused a sum of money to be set apart for this especial object. It must be particularly gratifying to all who have the welfare and encouragement of scientific work at heart to have this tangible proof of the enlightened interest which the present Ministry of South Australia takes, not only in assisting to obtain scientific materials, but also in making it available for the benefit of the scientific world.

At the meeting held in July, 1898, an important resolution was carried, expressing the desirability of a united action on the part of the Australian Colonies to arrange and publish an authoritative Treatise, as complete as possible, of the Australian race. There is every reason to hope that material assistance will be obtained from the various Governments for effectively carrying out this national work. It will also be conceded by all that no time should be lost in setting about the collecting of all available information. In South Australia, apparently, no systematic and comprehensive attempt has been made to study the aboriginal races of this colony. In the pages of our proceedings during the past twenty years appear various important, but isolated, contributions towards the anthropology of Australia. The most important of these are probably those relating to the tribes inhabiting an area of country having a radius of two or three hundred miles from a centre about the Finke River. The reason

why it is advanced that these contributions have a greater ethnological value, from an Australian point of view, than other important studies made to the west of the Gulf of Carpentaria, the Daly River, and other parts of the coastal region of the Northern Territory, is that the tribes in Central and Southern Australia are less likely to be mixed with other races. And one of the greatest points of interest in connection with the study of the aborigines of Australia would be that here, if anywhere, it should be possible to investigate perhaps one of the purest examples of a race that is autochthonic as contrasted to exotic in its local origin. In other words, in studying the purest examples of the Australian aborigines, the scientific investigator would be studying as purely local productions as would be found in the respective flora and fauna. The isolation of the Central and Southern parts of Australia from other centres of human occupation, the absence of rivers or other easy modes of transit, and the background of a vast uninhabited ocean, presents a habitat that is unique in the completion of its severance from the rest of the world or from any invading influences. So that whatever affinities the aborgines of Australia may have as a race with certain black Hill Tribes of Southern India or Papuans or Negritos of the Archipelagos to the east of Australia, they would still present a study from an isolation point of view vastly superior to any that could be obtained in any other country, or under any other existing conditions with which we are acquainted. Mr. Romanes attaches very great importance to the effects of isolation and devotes part III. of his work "Darwin and after Darwin" chiefly to a discussion of the varieties and bearings of isolation in modifying forms of life. "In isolation," he says, "we have a principle so fundamental and so universal that even the great principle of natural selection is less deep, and pervades a region of smaller extent." Isolation is defined as the prevention of intercrossing between a separate section of a species or kind and the rest of that species or kind; whether such separation be due to geographical barriers, to migration, or to any other state of matters leading to exclusive breeding within the separated group. This application of isolation to the aborigines of Central and Southern Australia has been particularly fortunate, as there is reason to believe that the Australian race is amongst the most primitive known, and the most direct issue of the primitive stock from which the various races bordering the greater part of the Indian Ocean may possible have been sprung in the remote past. If this should be the case with the aborigines of Australia it would tend to show that isolation must have an injurious effect on the development or the evolution upwards of any particular species. It is not difficult to

see how this may be, and how the effect would be somewhat similar to what takes place in what is called "composite portraiture." In the latter, for instance, only the more salient points of say some 50 portraits are manifested, the result being unlike any, and yet having some common resemblance to all. So in the long-continued breeding of a pure race the more salient features of the people would be the more likely to be perpetuated, and the minor deviations or tendencies to evolution would stand a greater risk of not being transmitted. If this view is correct, the picture presented by the aborigines of Australia is not that of a degenerate, but rather of a primitive race, a people whose chances of further evolution have been lessened by their extreme degree of isolation. As in the composite portrait, individual peculiarities would remain in abeyance and only the broader distinctive traits of the race or species would appear. As regards the idea that the aborigines of Australia are a degenerate or retrogressive race it appears that reliance is based chiefly on certain rites and customs to support the view. Mr. Helms, in the anthropological contribution to the results of the Elder Exploring Expedition, after rejecting the shipwreck theory, favours the opinion that the aborigines of Australia have become a retrogressive race, basing the conclusion on their extraordinary sexual rites for retarding an excess of population, on their complicated marriage laws, and, besides, on other remarkable features of intellectual culture, pointing to the supposition that they must be the remnants of a highly-advanced culture. It seems improbable that isolation would cause retrogression, although it would favour a race becoming stationary and perhaps accentuated. Another explanation may be advanced in place of retrogression. We possibly err in attaching a too high mental or intellectual value to the rites and customs mentioned by Mr. Helms, an error into which we do not fall in considering the many wonderful acts and habits of various animals. For instance, in considering the engineering skill of the beaver in constructing dams, it is not necessary to suppose that it had some Archimedean ancestor who had a genius for construction and the application of physics. Nor, again, to suppose that some ancestors of the honey-bee had a talent for practical sociology, and elaborated the existing ethics and distribution of labour which characterises ordinary hive-life. It is not necessary to suppose that these are examples of retrogression. As different substances emit sounds characteristic of themselves when struck, owing to some speciality in the arrangement and nature of their molecules, so it is conceivable that organisms would respond in varying ways to the constant action of stimuli. It is possible in this way to see how by a slow process of evolution the gradual adjusting of the nervous cellular structures with their

dendrites or branches under persistent stimuli of a given character may lead to a condition of unconscious cerebration, having all the appearance of conscious intent. We may all admire and appreciate the mechanical skill of these rodents, and the ethical effects of some of the customs of these insects, and of this species of the genus homo, but it is another matter, and a probably unwarranted assumption, to attribute the same power of intellectual appreciation to these beavers, honey-bees, or aborigines, either now or in the remote past, that we ourselves possess. That these three types of animals should have responded to stimuli in an apparently intelligent manner may be considered as evidence of the high quality of their primary nervous structure, but not necessarily as evidence of conscious volition of adapting means to an end. Personal contact with an aboriginal by no means shows him to be a stupid fellow, but it would be asking too much to expect him to appreciate the restraints of civilization. As an illustration of how savage man acts in common with many animals and birds in a way which more civilised peoples have lost may be mentioned the power of travelling to and reaching distant places without any apparent guidance. Darwin, in his posthumous "Essay on Instinct," which appears *in extenso* as an appendix to Mr. Romanes' work on "Mental Evolution in Animals," says we should be very cautious in attributing to migratory animals any capacity in this respect which we do not ourselves possess. And he quotes from the navigator Wrangel on the "unerring instinct" of the natives of N. Siberia, and from Sir George Grey's "Expedition to Australia" of the powers of the aborigines here, in the same direction. If any act has the appearance of conscious intent, it might be assumed that this power of unerringly travelling to a given place would be one. And yet there is no more ground for supposing that it is the case with savage man than with other members of the animal world.

An analogy may also be sought in the evolution of language, that results which appear volitional have not in reality so arisen. As Prof. Max Müller says in his "Chips," man in his primitive state was endowed, not only like the brute with the power of expressing his sensations by interjections and imitations, he possessed likewise the faculty of giving more articulate expression to the rational conceptions of his mind. That faculty was not of his own making. It was an instinct, and so far as language belongs to that instinct, it belongs to the realm of nature. And it is also seen that different anthropological centres responded to this instinct in different ways, but always in the same way as regards general construction for any particular centre. It thus may be assumed that languages, with their vocabularies and grammatical construction, were unconsciously

evolved as the result of stimuli acting on certain organisms endowed with a certain potentiality. As regards the individuals using any specific language, it was a case of unconscious cerebration, and it was left for the learned comparative philologist to explain the mechanism and the rationale. This is the only conclusion that can be reached, for it would be absurd to suppose that languages could have been consciously evolved by the peoples using them. Returning, then, to the curious rites and customs and laws of the aborigines of Australia, it does not seem necessary to suppose any antecedent condition of greater culture or civilisation to explain their existence. And this is more particularly the case as there appear absolutely to be no other vestiges of such supposed greater culture. Also, what is known as "unconscious cerebration" robs many intelligent acts of their claim to be the result of conscious intent.

I may shortly refer to the general custom of circumcision amongst many of the tribes of the Australian aborigines. This naturally is a custom closely associated in the mind with Jewish rites, and the question arises, Can there be any racial connection in the matter ? Some ethnologists have advanced the opinion that in the remote past there was a great African-Austro-Malayan centre of development of the human race. At this period of extreme antiquity there was probably a much greater distribution of land in the southern hemisphere than at present, and that there probably existed continents, now submerged, making communication between Australasia and Africa much easier. A reviewer of Wallace's "Malay Archipelago" in the "Anthropological Review" for 1869 writes:—"We shall not be surprised if in Madagascar be found the key to the problem of the relationship of the races of the Malayan Archipelago. If the dark and light tribes of this great island are sprung from the same stock, the same must be true of the dark and light races of the Archipelago. While, therefore, in the aborigines of Australia we may perhaps have the most direct issue of the primitive stock from which these races have sprung, we see in the tribes of Madagascar the secondary human centre from which both Malays and Papuans have branched off." The Rev. W. Ellis was struck with the Polynesian characteristics of the Hovas of Madagascar, and many observers, amongst whom may be mentioned Prof. Huxley, have maintained that the Papuans are more closely allied to certain African than to other races. The curious phenomenon has been referred to by some writers of the existence side by side of dark and light races at various remotely separated points around the basin of the Indian Ocean. Such were the light and dark hill tribes of India, the light and dark races of the Malayan Archi-

pelago, the Hovas and dark tribes of Madagascar, the Hottentots and Kaffirs, and the light and dark people of Semitic origin with African affinities. If in the remote dawn of the appearance of man on the earth the so called Semitic races had their earliest progenitors from amongst this great southern anthropological centre, of which the Australian aborigines are amongst the most primitive examples, it is a curious coincidence that a certain rite should be common to both notwithstanding their present great racial separation. If the theory may be allowed that the rites and customs of the Australian aborigines are the results of unconscious cerebration resulting from the action of a succession of stimuli on a certain pre-disposed nervous organisation, may it also be conceded that a similar underlying strain of nervous organisation exists also in the Semitic races. If the Australian aborigines and the Semitic peoples should have even this remote anthropological connection, it is conceivable that they would respond in a similar manner under certain conditions. It is evident that unless the Semitic nervous organization had been *en rapport* with the idea of circumcision, no mandates, however authoritative, would ever have nationalised it as completely as is seen in certain Semitic people.

What is wanted, however, are not theoretical speculations about Australian aborigines and their affinities, but the more prosaic work of collecting and arranging authoritative data. It is to be feared that there will be great difficulties in the way of obtaining these, and it will tax the energies and resources of the Australian anthropological leaders and specialists to initiate a working plan for overcoming these difficulties. Whatever this plan may be, it should be characterised by a uniformity applicable to the whole range of the subject, and it should be pursued with an unswerving steadiness. In the interests of the subject it is to be sincerely hoped that amongst our leaders in Australia may be found one who possesses the genius of organization, and that all others, great or small, will loyally contribute their quota to the best of their abilities and opportunities. If this national work on the Australian aborigines is carried out in a manner worthy of the subject, it will rank as one of the most important contributions to ethnological science.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1898.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1893. *COSSMANN, M., Rue de Maubeuge, 95, Paris.
1897. *DAVID, T. W. E., B.A., Professor of Geology Sydney University, New South Wales.
1897. *DENNANT, JOHN, F.G.S., Inspector Technical Schools, Camberwell, Victoria.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., late Government Astronomer Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Director Australian Museum, Sydney.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1897. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
1898. *MEYRICK, E. T., B. A., Ramsbury, Hungerford, Wiltshire, England.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer New South Wales, Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, South Australia.
1893. *MCKILLOP, REV. DAVID, S.J., late Daly River Mission, Northern Territory.
1886. NICOLAY, REV. C. G., Fremantle, W.A.
1883. *STIRLING, JAMES, Government Geologist, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1874. ANGAS, J. H., Adelaide, South Australia.
1897. *ASHBY, EDWIN, Adelaide, South Australia.
1887. BAGOT, JOHN, Adelaide, South Australia.
1893. *BEDNALL, W. T., Adelaide, South Australia.
1887. *BLACKBURN, REV. THOMAS, B.A., Woodville, South Australia.
1884. BOETTGER, OTTO, Adelaide, South Australia.
1886. *BRAGG, W. H., M.A., Professor of Mathematics University of Adelaide, South Australia.

1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1882. Browne, L. G., Adelaide, South Australia.
1897. *Browne, J. H., North Adelaide, South Australia.
1893. Brummitt, Robert, M.R.C.S., England, Kooringa, South Australia.
1884. Bussell, J. W., F.R.M.S., North Adelaide, South Australia.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, South Australia.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide, South Australia.
1895. Cooke, John H., Adelaide, South Australia.
1887. *Dixon, Samuel, Adelaide, South Australia.
1876. Dobbie, A. W., Adelaide, South Australia.
1896. Drummond, J. H. G.,, M.D, Moonta.
1893. Dudley, U., Drake, N.S.W.
1890. *East, J. J., F.G.S. (Corresponding Member, 1884), Adelaide.
1886. Fleming, David, North Adelaide, South Australia.
1882. Fowler, William, Melton, Yorke's Peninsula, South Australia.
1889. Fraser, J. C., Adelaide, South Australia.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, Adelaide, South Australia
1887. Grasby, W. C., F.L.S., Grenfell-street, Adelaide, South Australia.
1896. Greenway, Thomas J., East Adelaide.
1896. Hawker, E. W., LL.B., B.A., F.G.S., Gladstone Chambers, Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, South Australia.
1883. *Howchin, Walter, F.G.S., Goodwood East, South Australia.
1898. Hughes, Samuel, B.Sc., Registrar School of Mines, Adelaide.
1893. James, Thomas, M.R.C.S., England, Moonta, South Australia.
1896. Jones, J. W., Conservator of Water, Adelaide.
1853. (F) Kay, Robert, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide, South Australia.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1898. *Koch, Max, Mount Lyndhurst, Far North.
1897. Lea, A. M., Col. Entomologist, Perth, W.A.
1884. Lendon, A. A., M.D., M.R.C.S., Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.
1856. Lloyd, J. S., Adelaide, South Australia.
1888. *Lower, O. B., F. Ent. S., Broken Hill, N.S.W.
1885. *Lucas, R. B., Adelaide, South Australia.
1874. Mayo, G. G., C.E, Adelaide, South Australia.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, South Australia.
1897. *Morgan, A. M., M B., Ch.B, Adelaide.
1859. (L) Murray, David, Adelaide, South Australia.
1884. Munton, H. S., Brighton, South Australia.
1896. Parker, Thomas, C.E., F.G.S., Rockhampton, Queensland.
1893. Perks, R. H., M.D., F.R.C.S., Adelaide, South Australia.
1883. Phillips, W. H., Adelaide, South Australia.
1886. Poole, W. B., Adelaide, South Australia.
1892. Priestley, P. H., Unley Road, Parkside
1898. Purdie, Alex., M.A., Lecturer on Metallurgy School of Mines, Adelaide.

1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1876. *Rutt, Walter, C.E., Assistant Engineer-in-Chief, Adelaide, South Australia.
1891. Selway, W. H., Jun., Adelaide, South Australia.
1893. Simson, Augustus, Hobart, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, South Australia.
1871. Smith, Robert Barr, Adelaide, South Australia.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Director South Australian Museum, Adelaide, South Australia.
1893. *Streich, Victor, F.G.S., Windanya, W.A.
1876. *Tate, Ralph, F.G.S., Professor of Natural Science, University of Adelaide.
1886. *Tepper, J.G.O., F.L.S., Entomologist South Australian Museum (Corresponding Member, 1878), Adelaide, South Australia.
1898. *Torr, W. G., LL.D., Way College.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Joseph, J.P., Adelaide, South Australia.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on Therapeutics University of Adelaide, Adelaide, South Australia.
1883. Wainwright, E. H., B.Sc., St. Peter's College, South Australia.
1878. Ware, W. L., Adelaide, South Australia.
1859. Way, Right Hon. Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner, Adelaide, South Australia.
1886. *Zietz, A. H. C., F.L.S., Assistant Director South Australian Museum, South Australia.

ASSOCIATE.

1895. Cleland, John B., Parkside, South Australia.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

FIFTEENTH ANNUAL REPORT OF THE COMMITTEE,

BEING FOR THE YEAR ENDING SEPTEMBER 30, 1898.

Evening Meetings.—Eight evening meetings have been held, at which papers or lectures have been given as under :—

1897.

Oct. 19—"Seven Hundred Miles through Western Australia," Mr. S. Smeaton, B.A.

Nov. 16—"The Sun as the Sole Support of all Terrestrial Life," Mr. J. G. O. Tepper, F.L.S.

1898.

April 19—Meetings of the Science Congress at Sydney, held January, 1898—Mr. M. S. Clark, Mr. S. Smeaton, B.A., Mr. W. H Selway, jun.

May 17—Meetings of the Science Congress at Sydney, held January, 1898—Mr. W. H. Selway, jun. "The Influence of Vegetation on Climate and the Rainfall," Mr. J. G. O. Tepper, F.L.S.

June 21—"How Animals elude their Enemies," Mr. S. Smeaton, B.A.

July 19—"An Appeal for Scientific Workers on the Coleoptera," Rev. T. Blackburn, B.A.

Aug. 16—"The Origin, Growth, and Decline of Mountain Ranges," Mr. W. Howchin, F.G.S.

Sept. 20—"Annual Meeting, Chairman's Address, Mr. M. Symonds Clark.

From this list it will be seen that the addresses have covered perhaps a wider range even than usual. It is hoped that the Rev. T. Blackburn's appeal for scientific workers in the Coleoptera will meet with some response, as there are so few engaged in this important branch of Natural History in the Australian

Colonies. At another meeting it was mentioned that Major Reinbold, of Germany, was anxious to secure from these shores specimens of minute or parasitic algæ, and would be glad of correspondents in this colony.

Exhibits have formed, as usual, a prominent and interesting feature of the evening meetings. Amongst those shown during the year were some rare shells, including *Callochiton platessa*, and *Ephippodonta McDougalli*, from Port Willunga (this being a new locality for these shells). The egg of the Kiwi (*Apteryx Bulleri*); the fossil teeth of *Diprotodon australis*, found at Fulham, near Adelaide. Many flowering plants from the Port Elliot district, including *Claytonia corrigiolacea* (new locality), and the Alga, *Nitophyllum caulescens* (new species in 1897); pressed plants from Central Australia, besides scale-insects, birds, beetles, moths, butterflies. and marine specimens were amongst the exhibits shown at these meetings.

At the first evening meeting in 1898 the members of the Section did Mr. W. H. Selway, jr., the honour to present him with a handsome travelling bag as a memento of his services as Honorary Secretary for some years.

Excursions.—To many members the out-door meetings form the most attractive feature of the Section's operations, and, as we are essentially a *Field* Club, this is, perhaps, not to be wondered at. The following is a list of the twelve excursions made during the year :—

Date.	Place.
1897.	
Oct. 9	Montacute.
" 23	Aldgate.
Nov. 15	Port Noarlunga.
Dec. 11	National Park (Long Gully).
1898.	
March 19	Dredging off Semaphore.
April 23	Dredging Port River.
May 14	Highbury, and Messrs. C. F. Newman & Sons' Nursery, near Houghton.
June 20	(Whole day) Marino.
July 23	(Excursion to Athelstone arranged, but not held owing to inclement weather).
Aug. 13	Anstey's Hill and Messrs. Newman's Nursery.
Sept. 1	(Whole day) Field's River, via Reynella.
" 24	Tea Tree Gully.

Of the above the trip to Port Noarlunga was the longest, but the weather then was too hot to render energetic investigations at all agreeable, although geology and conchology received some attention. A new locality was found in the walk down Field's River from Reynella, when a pleasant and instructive day was pent in geological study. The largest attended exccursion

was that to Montacute, when geology was again in the ascendant and the scene of the old gold mine at that place was viewed with interest. For botanical results the visit to Aldgate was the most successful, when quite a dozen distinct species of orchids were found, including *Thelymitra grandiflora*, *T. urnalis*, *T. ixioides*, and *Calochilus Robertsoni*. Other flowers then seen were *Beckea diffusa* and a white variety of *Kennedya prostrata*. *Conospermum patens* was found at Highbury on May 14, and the orchid *Diuris maculata*, was gathered in the same locality on August 13. On various excursions bird-life received some attention, but no outing especially for this purpose was made. Before going into summer recess a picnic excursion was made in December last to the upper portion of National Park, when the opportunity was taken of explaining to present members the history of the successful efforts made by this Section in past years to obtain Government Farm vested in trustees for the public benefit. The experiment of continuing the excursions right through the winter months was again tried with success, only one engagement, that fixed for July, falling through on account of inclement weather. The attendance at both indoor meetings and excursions has been well maintained during the year.

Protection of our Native Fauna and Flora.—A separate report deals with this important branch of the Section's work. It will be seen therefrom that the consideration of the Bill for the Protection of Birds has been the chief feature of this year's efforts.

Rules.—During the year a revised edition of the Rules of the Section has been printed and distributed to the members.

Sydney Science Congress.—Several members of this Section had the privilege of attending the meetings of the Australasian Association for the Advancement of Science, held in Sydney in January last, and derived much profit and pleasure from their visit.

Obituary.—Your Committee regret to have to record the death since last annual meeting of Messrs. T. Fabian and T. Evans, who were Foundation members of the Section, and who audited its accounts for many years past.

Financial.—The subscriptions, as in the two previous years, have considerably exceeded the disbursements, and the Parent Society, therefore, continues to benefit financially by the Section's existence.

Membership.—More new members have joined than in the previous year, whilst more names have also been removed from the roll, so that the membership continues stationary. The number now on the list is 87.

M. Symonds Clark, Chairman
W. H. Selway, Jun., Hon. Secretary.

Adelaide, September 19, 1898.

TENTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE, TO BE PRESENTED TO THE ANNUAL MEETING OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA, 20TH SEPTEMBER, 1898.

The Committee have met three times only in the past year; but a great deal of attention has been given by members to the Birds and Other Animals Protection Bill. The late Minister of Education had promised to take charge of the Bill, which was printed by the Government, and the Committee had hoped that it might be passed by the last session of Parliament. Dr. Cockburn obtained leave for its introduction, but unfortunately did not proceed further with it.

The Secretary had an opportunity of handing to Mr. A. J. Campbell, of Melbourne, whose articles on "Australian Birds" in the *Australasian* are well known, a copy of the Bill, and he suggested alterations in some of the vernacular names in the first schedule (which the Committee decided should be embodied therein as alternative names), to make them agree with those adopted by the Committee of the Australasian Association for the Advancement of Science.

Recently a legal gentleman occupying a high position in Adelaide, who takes a very warm interest in the preservation of our birds, recommended several alterations in the Bill, the chief of which was the elimination of all reference to "other animals," and the change of the title to "The Birds' Protection Bill." The Bill was printed in its new form, and sent to the Secretary of the Society for the Protection of Birds, who forwarded it to this Committee. The phraseology had been altered, making it more concise and otherwise improving the Bill. After carefully considering it, the Committee, though regretting the omission of the protection to "other animals," which would have been afforded by their own Bill, decided to accept it, subject to a few alterations. The Committee hope that this Bill will be speedily introduced, so that it will become law this session.

In the opinion of the Committee this question becomes daily of more importance, and recent action in Germany, France, and America shows the imperative necessity for protective legislation without which it is hopelesss to expect the preservation of many invaluable birds, whose destruction of insect pests tends so much to the successful cultivation of our vegetable products. But the Committee feel that unless supported by public opinion the best legislation is liable to be inoperative.

SAMUEL DIXON, Chairman.

Adelaide, September 19, 1898.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year, 1897-8

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.	£	s.	d.
To Balance brought forward	2	19	6	By Postage and Sundries	5	2	7			
" Subscriptions	17	0	0	" Printing	4	8	6			
" Grant from Royal Society	10	0	0	" Attendance	1	0	0			
								10	11	1
				" Subscriptions paid over to Royal Society				15	0	0
				" Balance in hand				4	8	5
	£29	19	6					£29	19	6

Audited and found correct,

J. S. LLOYD,
J. W. BUSSELL, } Auditors.

Adelaide, 19th September, 1898.

W. H. SELWAY, Jun.,
Hon. Secretary and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

SIXTH ANNUAL REPORT.

In submitting this report, the Committee congratulate their fellow-members on the continued success of the Section as a society, the roll showing a slight increase in strength, notwithstanding some having dropped out by reason of not paying their subscriptions under Rule XI.

Five general meetings have been held during the past year, one of which was devoted to viewing the stars by the aid of the Equatorial in the dome of the Observatory; another being entirely given up to the discussion of the subject of a Bill then before Parliament, by which it was proposed to make an alteration in the standard time of the colony, and which, by a resolution of the Legislative Council, had been referred to the Astronomical Section for a report thereon. This meeting was held on the 25th August, 1898, and was largely attended, and the following resolution unanimously carried :—"That if in the commercial interest of South Australia any change is desirable, it should be in the alteration of the nominal hours of business rather than in the present standard time, which is part of an almost universal system."

This resolution was embodied in a report, and immediately thereafter forwarded to the Honorable the Chief Secretary as the report of the Section on the said Bill.

The Committee met five times during the past year.

Papers on the following subjects have been read :—

"The New Astronomy." Lady Brown.

"Time and its Measurement." Sir Charles Todd, F.R.S.

"Is it probable there can be a Second Moon to the Earth." Capt. Lee.

These and other cognate subjects have been discussed at the General Meetings.

The Astronomical Notes (which have been issued to members monthly since July, 1895) have during the past year proved as instructive as in former years, their publication being one of the bulwarks of the Society.

Circulars have been sent to members, inviting them to forward subjects for discussion, and the question-box is still open to those desiring information on any subject.

Adopted at the Annual Meeting of the Society, held at the Adelaide Observatory, on the evening of Tuesday, 11th October, 1898.

C. Todd, President.
W. E. Cheeseman, Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY, SOUTH AUSTRALIA

Balance-Sheet for Year Ending, 30th September, 1898.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance, September, 1897	22	10	6	By Royal Society	17	10	0
" Subscriptions	10	0	0	" Postage	2	19	6
" Interest	0	9	7	" Stationery	0	14	0
				" Advertising	0	6	6
				" Printing Monthly Notes	2	8	0
				" Balance	9	2	1
	£33	0	1		£33	0	1

Read at annual meeting, 11th October, 1898, and adopted.

C. TODD, President. W. E. CHEESMAN, Secretary and Treasurer.

Audited and found correct,

RICHARD F. GRIFFITHS.

GENERAL INDEX.

[Generic or specific names printed in italics are described as new

Acacia papyrocarpa, 119.
Acanthochites *cornutus*, 217; *crocidilus*, 216; *exilis*, 218; *Maughani*, 218; *Tatei*, 219; *Verconis*, 217.
Aglaodes chionoma, 205.
Amphiops (?) *australicus*, 226; *duplopunctulatus*, 226.
Anacanthopus inermis, 42.
Anencomides coloratus, 34.
Anniversary Address, 243.
Aphalara *tecta*, 6.
Aristida depressa, 237.
Ashby, E., New Species of Polyplacophorae, 215.
Aulacophora Palmerstoni, 233.
Berosus *debilipennis*, 224; *queenslandicus*, 225.
Berosus, tabulation of species of, 222.
Betche, E., and J. H. Maiden, on a new Myoporum, 76.
Birds, List of, collected by the Calvert Expedition, 125.
Blackburn, T. Further Notes on Australian Coleoptera, 18, 221.
Blennodia cardaminoides, 123; procumbens, 123.
Browne, J. H., use of Wedge by Aborigines, 234.
Calvert Expedition, list of birds collected by, 125
Cambrian Trilobite from Yorke Peninsula, 1.
Caulobius *advena*, 51; *compactus*, 53; *discedens*, 52; *evanescens*, 54; *punctulatus*, 51.
Chalcophaps chrysochlora, 236.
Cheiragra, species of, 27.
Cheirrhamphica interstitialis, 26; *pubescens*, 25.
Chiton *Verconis*, 215.
Cleland, W. L., Anniversary Address, 243.
Coesyra *iodeta*, 211.
Coleoptera, Australian, 18, 221.
Colpochila Roei, 35.
Colpochilodes rancipennis, 44.
Corbin, H. B., Graphitic Slates at Kalgoorlie, 72.
Corchorus *longipes*, 119.
Cretaceous fossils, new species of, 77.
Crossophora *nephelella*, 212.
Croydon-bore, 194.
Cruciferæ, dimorphism in two S. Australian species of, 122.
Cyclonotum *Courteni*, 229.
Cyclostremella Lodderæ, 239.
Cyperus lævigatus, 237.
Dimorphism in S. Australian Crucifers, 122.
Dysphanochila pilosipennis, 48.
Eucnops spectans, 43.
Eocene fossils from Croydon and other bores, 194.
Epholcis *longipes*, 29.
Etheridge, R., A further Cambrian Trilobite from Yorke Peninsula, 1.
Eulechria *candida*, 206; *chryseres*, 207; *concolor*, 206; *diaphanes*, 207; *silvicola*, 206.
Eulima augur, 80; *commensalis*, 82; *indiscreta*, 82; *orthopleura*, 80; Tenisoni, 81.
Eulimella moniliformis, 82; *tricincta*, 83.
Eulimidae, Australian, 80.
Eupselia *anommata*, 204; beatella, 203.
Frenchella *approximans*, 40; *aspericollis*, 41; *hirticollis*, 40; *hispida*, 39; *sparsiceps*, 41.
Geococcus pusillus, 123
Glacial Remains in South Australia, further discoveries of, 12.
Glossocheilifer labialis, 36.
Glyphipteryx atristriella, 204.
Graphitic slates at Kalgoorlie, 72.
Halticodes disparipes, 233.
Haplopsis *debilis*, *lineoligera*, *Olliffi*, 50.
Helipterum microglossum, 121.
Howchin, W., Further discoveries of Glacial Remains in South Australia, 12.
Hydræna *evanescens*, 229.
Hydrochus *diversiceps*, 228; *interioris*, 228; tabulation of species of, 227.
Hydrusa, tabulation of species of, 92.
Hydrusa annulata, 98; antitheta, 97; aperta, 95; ecliptis, 94; humeralis, 97; *lampetis*, 94; leucacana, 95; *orphnaea*, 98; phepsalotis, 99; pyrrhodera, 95; recedens, 99; *sphenophora*, 94; *trigonophora*, 97; *xanthosoma*, 93.
Hygotrophus *De Visi*, 225.
Hyponometa *myriosema*, 200.
Hypertropha *ametalla*, 202.
Kalgoorlie, Graphitic Slates at, 72.
Keartland, G. A., field notes on birds of N.W. Australia, 125.
Ki-ki bore, fossils from, 198.
Koch, Max, List of Mt. Lyndhurst plants, 101.
Lepidoptera, Australian, 90, 200.
Linosticha *poliochroa*, 208.
Lucina? *Bonythoni*, 77.
Mæchidius *antennalis*, 62; *collaris*, 60; *excisicollis*, 62; *gibbicollis*, 59; *imitator*, 60; *modicus*, 61; *multistriatus*, 61; ordensis, 60.
Mæchidius, tabulation of species of, 57.
Maiden, J. H., and E. Betche, on a new Myoporum, 76.
Maskell, W. M., on some Australian Psyllidæ, 4.
Melolonthini, subtribes of, 18.
Microlepidoptera, Australian, 200.
Mollusca, Australian, 80, 86, 215.
Monolepta alpina, 233.
Morgan, A. M., Nest and eggs of Porzona fluminea, 193.
Mount Lyndhurst Run, List of plants on, 101.
Myoporum *refractum*, 76.
Neohydrobius burrundiensis, 221.
Neophyllotocus rostrata, 27.
Neso planicollis, 46; *usta*, 45; *Yorkensis*, 46.
Newer Pleistocene, deep-level deposits of, 65.
North, A. J., List of Birds of N.W. Australia 125.

Nosphisthi parvicornis, 38.
Notoceryon dorsale, 230; *ornatum*, 230.
Ochthebius *brisbanensis*, 229.
Odontostomia *infrasulcata*, 83; *Jonesiana*, 78, 83; *Mayii*, 84.
Œcophoridae, Australian, 205.
Peltophora *aureola*, 211; *idiocosma*, 210; *osteochroa*, 210.
Petinopus aegrotus, 35.
Philobota *cosmia*, 209; *melichrodes*, 209 *rhodopleura*, 208; *sororia*, 210.
Philobrya *Bernardi*, 88; crenulatifera, 87; *fimbriata*, 87; *praenuntia*, 88; trigonopsis, 87.
Phyllotocidium Macleayi, 24.
Plants of the Mt. Lyndhurst Run, 101.
Plants of South Australia, new or little known, 119.
Platopis (?) *corrugata*, 78.
Pleistocene, deep-level deposits of, 65 species of, 67.
Plutellidae, Australian, 200.
Polyplacophorae, Australian, 215.
Polypodium proliferum, 235.
Polynesa maculosa, 201.
Port Pirie bore, deep-level Pleistocene deposits, 68.
Porzana fluminea, nest and eggs of, 193.
Psecadia *heptasema*, 213; *hilarella*, 213.
Pseudohydrobius floricola, 231.
Pseudoliotia micans, 239; var. *simplicior*. 71.
Psylla *Lidgetti*, 5.
Ptychoparia *Howchini*, 2.
Pyramidellidae, Australian, 82.
Pyrgostylus *varicifer*, 85.
Pyrgulina *Mayii*, 84.
Queensland Microlepidoptera, 200.
Rhopæa *hirtuosa*, 63; *morbillosa*, 64.
Saropla *psammodes*, 211.
Scitala, species of, 37.
Sciton *paullus*, 47.
Sericides, genera of, 20.
Sericoides, genera of, 29.
Simæthis *metallica*, 202.
Sisymbrium cardaminoides, 123.
South Australia, further discoveries of Glacial remains, 12.
Spathopterus alexandræ, 130, 235.
Stenopetalum sphærocarpum, 122.
Syntomis angustipenna, 92.
Syrnola *infrasulcata*, 83; *Jonesiana*, 70, 83.
Tate, R., Deep-level Deposits of Newer Pleistocene in South Australia, 65 on two new Cretaceous bivalves, 77; on some Australian species of Eulimidæ and Pyramidellidæ, 80; on some recent and fossil Philobryæ, 86; dimorphism in two S. Australian Crucifers, 122; on some new or little-known South Australian Plants, 119; on deep-seated Eocene strata in South Australia, 194.
Terillus micans, 232.
Tintinara bore deep-level Pleistocene deposits, 65; Eocene fossils from, 197.
Torr, W. G., New Species of Polyplacophorae, 215.
Trilobite from Cambrian of Yorke Peninsula, 1.
Trioza multitudinea, 8.
Turbonilla Beddomei, 85; erubescens, 84; *varicifera*, 85.
Turner, A. J., new Australian Lepidoptera, 90; new Microlepidoptera, 200.

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